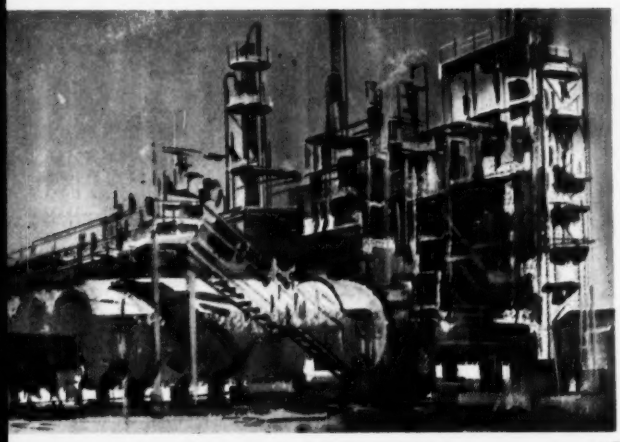
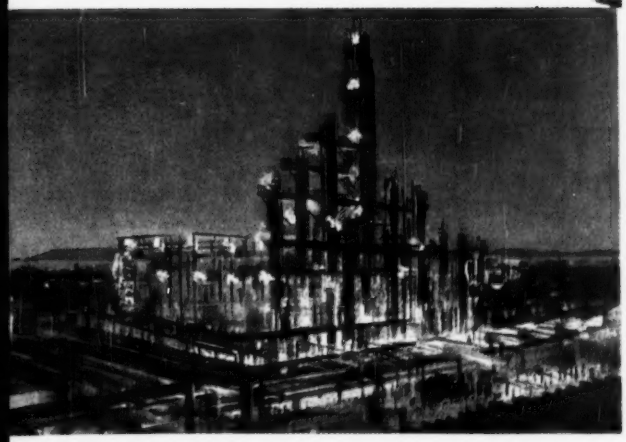
A McGRAW-HILL PUBLICATION

Chemical Week





Special Report: The regrouping at Allied . p. 51

D-Day for deepwater shipping —showdown for chemical firms' Seaway plans . . p. 21

How Purex grows: West Coast laundry products maker weaves nationwide net of acquisitions . . . . . p. 41

Polyethylene's place in sun is enhanced by new film-protecting uv. absorber . . p. 87

Faster filter changing is feature of new nonmetallic textile closure . . . . . p. 104

April 11 cents

ANN ARBOR MICH
513 N 1ST ST
UNIVERSITY MICROFILMS
STEVENS RICE

How to hit what you can't see

Might as well try to hit big-league pitching in a blackout as to set out to whack a nematode. For nematodes are no larger than these dots . . . and live unseen in the soil. But while you don't see these microscopic parasites, it's only too easy to spot the damage they cause.

Striking at the roots of cotton or tomatoes, strawberries or potatoes, or just about any plant that grows, nematodes sap the vigor of the crop and many times completely destroy it. To help growers hit back at these tiny worms, Shell Chemical developed Nemagon® Soil Fumigant. Applied to the soil, this remarkable nematocide changes to a gas . . . penetrates the earth with a vaporous barrage no nematode can escape. Yet it is harmless to most living plants.

Developing soil fumigants that enable farmers to protect their crops is one more way Shell Chemical, with its pesticides and fertilizers, safeguards the roots of a land of plenty.

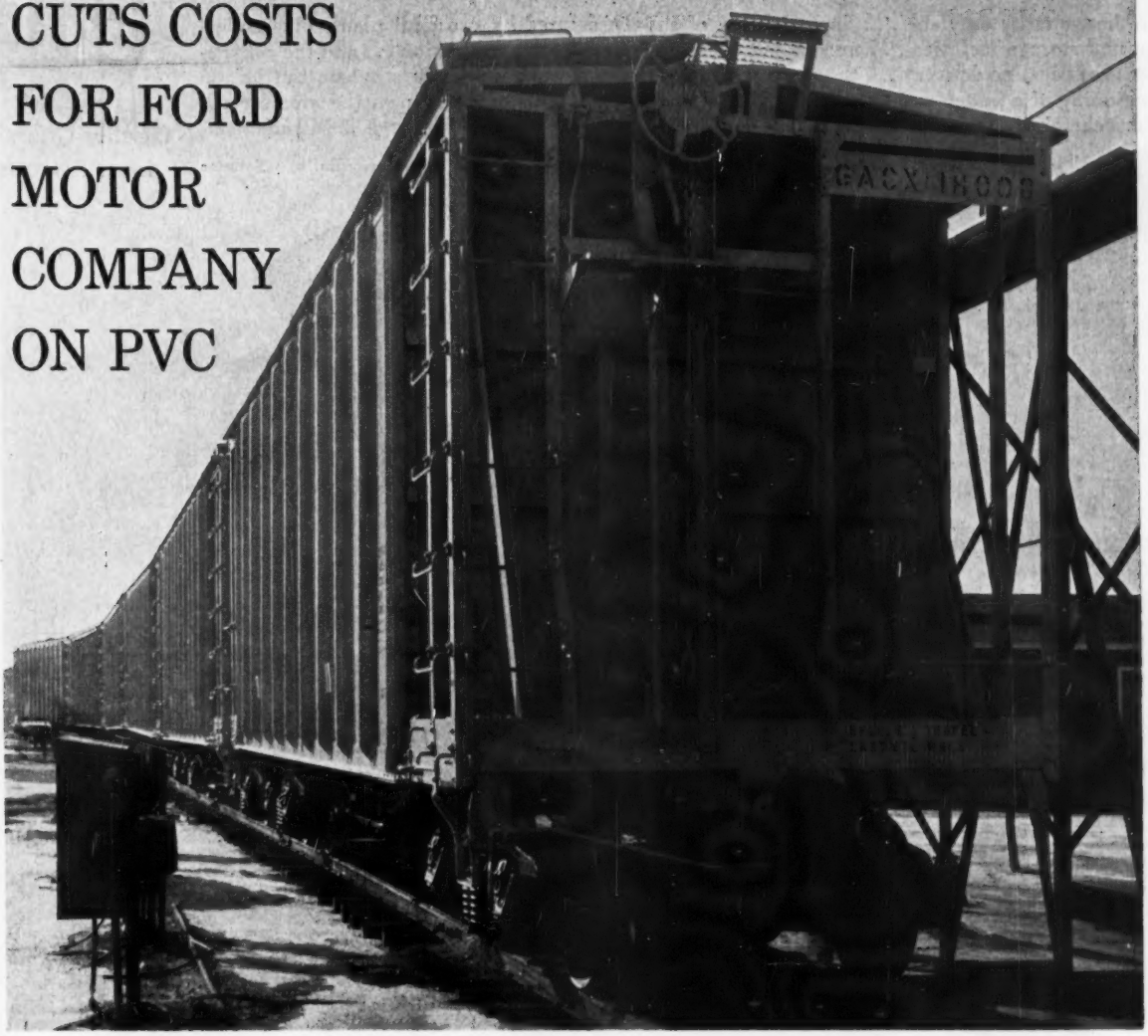
Shell Chemical Corporation

Chemical Partner of Industry and Agriculture

NEW YORK

SHELL

BULK SHIPPING VIA AIRSLIDE® CARS CUTS COSTS FOR FORD MOTOR COMPANY ON PVC



Producing a better car for the least possible money is a constant challenge to auto manufacturers. To help solve this problem the Ford Motor Company is cutting costs of transporting PVC resin by bulk shipping in Airslide cars.

As a result, Ford not only gets substantial savings, but receives the PVC without in-transit contamination.

The Airslide car is filled by blowing the resin through one of the top hatches of the car. At the unloading point, low pressure air is used to aerate the PVC and cause it to discharge by gravity. The product is then taken under vacuum through a pipe to storage bins.

If you ship or receive dry granular chemicals in bulk, investigate the advantages of shipping via Airslide car. You'll find *it pays to plan with General America.*

Airslide Car Department
GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South LaSalle Street · Chicago 90, Illinois
In Canada: Canadian General Transit Co., Ltd., Montreal

AIRSLIDE GENERAL AMERICAN TRADE MARK

POLYETHYLENE? YOU CAN MAKE IT BETTER WITH GULF ETHYLENE

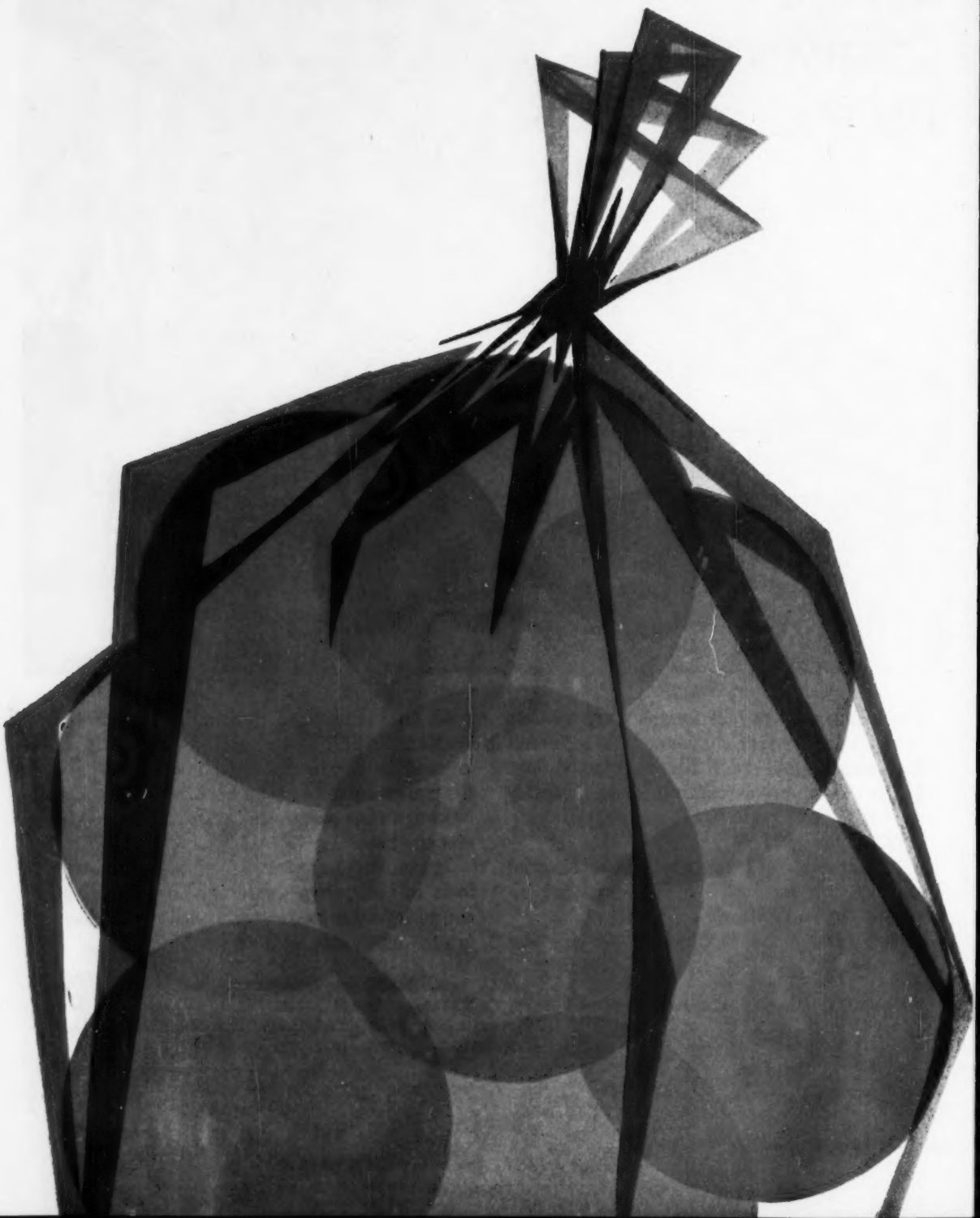
Thinking about going into polyethylene . . . or any other product that requires high quality ethylene? Then it will pay you to build your plant on Gulf's pipeline system, in the heart of Texas' chemical-producing country.

Highest quality ethylene . . . dependability of supply, assured by two Gulf plants plus underground storage facilities . . . unequalled experience in ethylene production . . . and the convenience of pipeline delivery . . . these are just some of the reasons why Gulf ethylene can be the beginning of a better end product for you. Write us for details and a map of the area served. Petrochemicals Department, Gulf Oil Corporation, Gulf Building, Pittsburgh 30, Penna.

Benzene • Ethylene • Isooctyl Alcohol • Propylene • Propylene Trimer and Tetramer • Sulfur • Toluene

GULF

Quality Chemical from Petroleum



Chemical Week

TOP OF THE WEEK **APRIL 11, 1959**

- **Looking for a Gulf Coast plant site?** Mississippi's Bayou Casotte industrial area wants chemical plants .....**p. 30**
- **McKesson chemical division's expansion furthered** by purchase of Barada & Page, big Southwest distributor .....**p. 65**
- **Salt sales recovery seems assured**—Morton's new mine reflects industry faith in expanding markets in the CPI .....**p. 75**
- **Low-pressure process for acetylene chemicals** is going commercial at Lakeside Laboratories .....**p. 96**

10 OPINION
10 VIEWPOINT
17 BUSINESS NEWSLETTER

21 Seaway opening this month brings U.S., Canadian chemical makers new shipping and marketing opportunities.

23 Heyden Newport tries upgrading basic commodities as route to profits in '59.

24 M. W. Kellogg gains a point in suit over Texas City methanol plant; New York Court holds Monsanto and Heyden should accept arbitration.

24 Chemical plants as cold war weapons: Russia offers equipment, technology and credit to Iraq.

27 WASHINGTON NEWSLETTER

30 ADMINISTRATION
New bidder for process industry plants—Mississippi's Bayou Casotte budding Gulf Coast manufacturing center.

32 Help your customers solve their financial problems, gain business bonus. That's Crown Zellerbach's policy. Here's how it works.

41 SPECIALTIES
Here's how Purex Corp. has grown to No. 4 spot in the laundry products field by some sage acquisitions.

44 Flexible magnets made of metal-containing plastic now offered for variety of applications.

51 SPECIAL REPORT
Realignment of Allied Chemical's divisions has brought new potency to this chemical giant.

65 SALES
McKesson & Robbins' chemical department hopes for $100-million/year volume by '69, takes over Barada & Page to beef up bulk-packaging interests.

66 Water and truck carriers blast rail proposals to try special rates on certain types of freight hauling.

75 MARKETS
U.S. salt production slumped 14% in '58, but producers aren't fretting; they're confidentally opening new mines.

83 TECHNOLOGY NEWSLETTER

87 RESEARCH
American Cyanamid's new ultraviolet-light absorber may find $1-million market as protectant for clear polyethylene.

88 Advances in zone refining of metals showed off this week by both Bell Labs and Sylvania.

91 Building Research Institute emphasizes research targets in construction materials.

93 MARKET NEWSLETTER

96 ENGINEERING
Lakeside Laboratories' low-pressure synthesis spawns a brood of new acetylene chemicals.

102 Japan's Mitsui Petrochemical turns out first terephthalic acid made by Amoco's direct-oxidation process.

104 PRODUCTION
Novel, "burrlike" fastener developed for clothing has processing use in quick-change filter cloths.

110 BUSINESS BENCHMARKS

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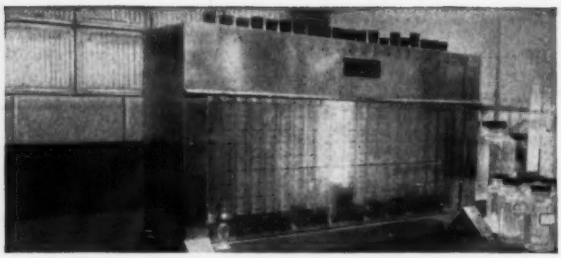


A look at today...and a glimpse

Armour's ethoxylated chemicals

Most industries have surfactant problems that can be solved by Armour's versatile polyethoxylated derivatives. These compounds range from completely oil soluble to completely water soluble, and from cationic to non-ionic in activity.

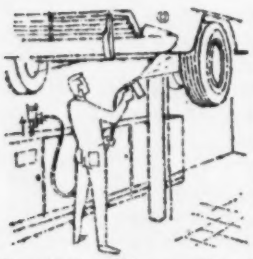
More than 40 different chemicals offer you a wide range of properties to work with in solving your own surfactant problems. This great flexibility assures you exactly the right combination for each application. And with the recent expansion of our etho-chemical unit at McCook, Illinois, prices of these compounds have been reduced.

The etho-chemicals fall into five major groups—the Ethomeens®, Ethoduomeens®, Ethomids®, Ethofats® and the newly introduced Ethoquads®.

Where Armour's ethoxylated chemicals work today

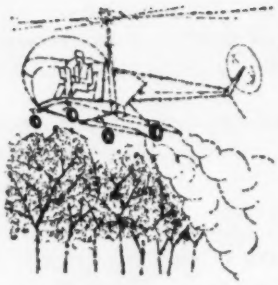
Mineral oil emulsions. In processing paper and textiles, three properties make Ethomeen S/15 (polyethoxylated soya amine) an important cationic emulsifying agent for mineral oils. These properties provide: (1) effective anti-static results; (2) increased ability to adjust the stability of emulsions; and (3) excellent hard water tolerance. Because this chemical provides an anti-static property to emulsions, it is especially valuable when working with wool and synthetic fibers.

For more information, check "A" in the coupon.



Sound absorbers. Improved sound-proofing compounds are being made by wetting asbestos or fiber fillers rapidly and uniformly with chemically-treated asphalt. The chemical that makes it possible is Ethoduomeen T/13 (a polyethoxylated N-tallow diamine). It's proving to be a vital ingredient in many asphalt-based undercoating materials for automobiles and in several important industrial sound-deadening compounds.

More technical data is available. Check "B" in the coupon.



Agricultural emulsifiable concentrates. Many manufacturers are discovering that non-ionic Ethofats can be combined with either anionics or cationics to produce far more efficient blends of emulsifiers. For example, improved emulsification of the oil solutions of DDT, chloradane, toxaphene, and 2-4-D is being obtained by using an Ethofat.

Ethofat C/15 (polyethoxylated coconut fatty acid) and Ethofat 242/25 (polyethoxylated rosin fatty acid) are proving to be excellent wetting agents for wettable powders in several pesticide formulations.

Want more details? Check "C" in the coupon.

Silicone emulsions. Major silicone suppliers are today recommending Armour's Ethomids as non-ionic emulsifiers for silicone resins. Ethomid emulsions are stable in both concentrated and dilute form. They show little tendency to rewet or yellow, and are compatible with most finishing resins. Ethomid HT/15 (polyethoxylated hydrogenated tallow fatty amide) and Ethomid 0/15 (polyethoxylated oleamide) are currently being used in this particular application.

Check "D" in the coupon for more complete information.

Pigment dispersion. Ethomeen S/12, when combined with other Armour cationics, offers manufacturers a unique system of coating organic and inorganic pigments. The Ethomeen greatly improves the dispersion of these pigments in paints, plastics, and rubber. Other Armour etho-chemicals also are demonstrating their ability to perform as dispersants. Because of the large number of different pigments and vehicles available, Armour welcomes the opportunity to recommend the proper etho-chemical for your requirements.

For technical data, check "E" in the coupon.

Chemical structures

The Ethoquads® are a new series of polyethoxylated quaternary ammonium compounds formed by quaternization of the Ethomeens.

$$\left[R-\overset{\displaystyle CH_3}{\overset{|}{N}}\!\begin{matrix}(CH_2CH_2O)_xH \\ (CH_2CH_2O)_yH\end{matrix} \right]^{+} Cl^{-}$$

# of tomorrow

from Armour Chemical

The Ethomeens® are prepared from n-alkyl primary amines. They have an ethylene oxide content ranging from 2 to 50 moles per mole of amine.

$$RN\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

The Ethoduomeens®, like Ethomeens, are reaction products of amines and ethylene oxide. The difference: Ethoduomeens are obtained by the ethoxylation of n-alkyl trimethylene diamines.

$$\begin{matrix}(CH_2CH_2O)_zH\\ |\\ R-N-CH_2CH_2CH_2N\end{matrix}\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

The Ethomids® are N, N-substituted fatty acid amides. The substituents being polyoxyethylene groups. The Ethomids are chemically neutral and rather unreactive.

$$\begin{matrix}O\\ ||\\ RCN\end{matrix}\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

The Ethofats® are mono-fatty or rosin acid esters of polyoxyethylene glycols. These esters are fairly stable in mildly acid or alkaline solutions. They can, however, be hydrolyzed by refluxing with strong acids or alkalies.

$$\begin{matrix}O\\ ||\\ RCO(CH_2CH_2O)_xH\end{matrix}$$

Armour's ethoxylated chemicals tomorrow

Armour research with the etho-chemicals finds their versatility to be virtually unlimited.

Examples: Ethomeens are suspending high density metallic fines in selected oil systems. Ethoduomeens are being evaluated as building blocks for asphalt adhesion additives and as cationic asphalt emulsifying agents. Many etho-chemicals show great promise as internal anti-static agents in polyvinyl chloride and polyvinyl acetate-polyvinyl chloride copolymers.

Investigate the Ethoquads, Ethomeens, Ethoduomeens, Ethomids and Ethofats. Find out what they're doing in your industry. Send the coupon or call Armour today.

NEWS NOTES

Chicago. Recent modifications in pilot plant production and analytical methods now assure more uniformity in alpha sulfoalkyl acids . . . $RCH(SO_3H)COOH$. New samples of alpha sulfopalmitic and alpha sulfosteric acids are now available from Armour.

•

Barcelona, Spain. The first shipment of Ethomeen to this country arrived from New York. These ethoxylated aliphatic amines are finding widespread use in the country's expanding synthetic fiber industry.

•

Akron, Ohio. Armour's oleyl nitrile, Arneel® OD, is replacing Arneel SD (soya nitrile), as a synthetic rubber plasticizer. Recent tests show this particular Arneel offers a greatly reduced odor level, more uniform consistency and slightly improved physical properties at low temperatures.

•

McCook, Ill. Production of the Ethofat 142 series was recently discontinued with the introduction of Ethofat 0/15 and 0/20. In addition to the new products having equivalent emulsifying characteristics, they have a very low percentage of linoleic acid which minimizes oxidation. The Ethofat O series, unlike the Ethofat 142 series, contains no rosin acids.

ARMOUR CHEMICAL DIVISION

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How can the etho-chemicals help you?

Check here for more information on your field of interest.

☐ A ☐ B ☐ C ☐ D ☐ E

Send sample for this application:

_____

_____

NAME_____

POSITION_____

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(Sample offer limited to North American Continent) CW-4-59

LUMMUS

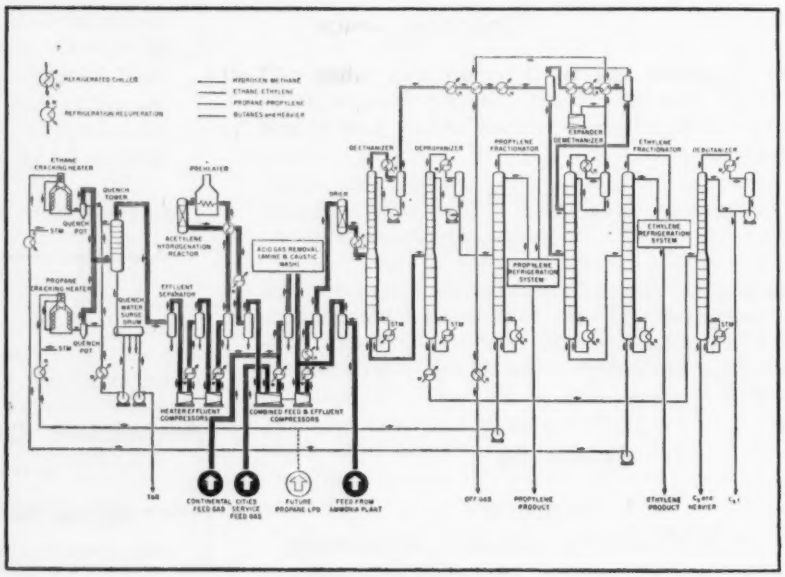
ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

NEW ETHYLENE PROCESS DEVELOPED BY LUMMUS PROVIDES HIGH EFFICIENCY, UNUSUAL FEED-STOCK FLEXIBILITY

200,000,000 Lb/Year Plant for Petroleum Chemicals, Inc. Produces 99.7% Ethylene

The new Petroleum Chemicals, Inc. ethylene plant, now on stream at Lake Charles, Louisiana, incorporates a unique ethylene separation process developed by Lummus which provides high separation efficiencies and unusual flexibility and reliability (See flowsheet).

Lummus has designed the plant for rapid 50% expansion to a rate of 300,000,000 lbs/year. Ethylene is produced in two grades — the highest, 99.7%; the other, 98%. Co-products are high purity propylene, a butane-butylene fraction and aromatic distillate. Operations have been marked by continuous production of specification ethylene under widely varying rates and feed stock compositions.



Feed Gases From Three Sources

Feed gases for the P.C.I. plant are provided from three different sources: the nearby refineries of Cities Service and Continental Oil—by whom P.C.I. is jointly owned—and P.C.I.'s new ammonia plant.

High Efficiency Expanders

All major compressors in the Lummus-designed low temperature fractionation unit are driven by three 12,500 HP gas turbines. Gas turbine exhaust serves as preheated air for three high pressure steam generators. High efficiency expanders provide low temperatures for maximum ethylene recovery.

Ethylene is delivered via pipeline to customers at Orange, Texas. In addition, part of the new plant's output feeds the adjacent Calcasieu Chemical Corporation ethylene oxide and glycol plant, also engineered and constructed by Lummus.

This plant brings the total of Lummus-designed ethylene plants to 13, with a combined capacity of over 1 billion pounds per year: (contd. next page)

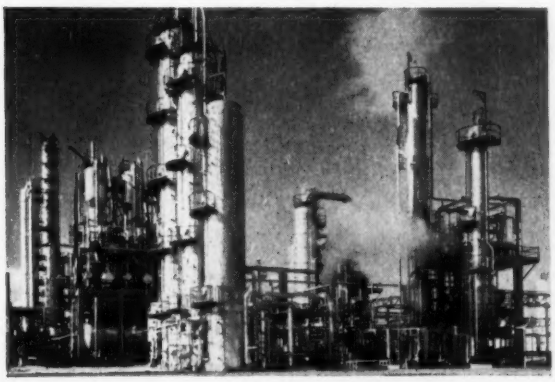
CUSTOMER	LOCATION
Monsanto Chemical Co.	Texas City, Texas, U.S.A.
Jefferson Chemical Co.	Port Neches, Texas, U.S.A.
E. I. du Pont de Nemours & Co.	Orange, Texas, U.S.A.
Texas Eastman Co.	Longview, Texas, U.S.A.
Gulf Oil Corp.	Port Arthur, Texas, U.S.A.
Societe Naphtachimie S.A.	L'Avera, France
Allied Chemicals Corp.	Tonawanda, New York, U.S.A.
National Petrochemicals Corp.	Tuscola, Illinois, U.S.A.
Canadian Industries, Ltd. (2 plants)	Edmonton, Alberta, Canada
Polymer Corporation Ltd.	Sarnia, Ontario, Canada
Societa Edison	Mantova, Italy
Petroleum Chemicals, Inc.	Lake Charles, La., U.S.A.

New Ethylene Oxide-Glycol Plant is third Shell process unit engineered and built by Lummus

Calcasieu Chemical Corporation's new ethylene oxide-glycol plant at Lake Charles, Louisiana is on stream and producing 8,000,000 gallons annually of ethylene glycol or 57,000,000 pounds of ethylene oxide.

Designed and engineered by The Lummus Company, the plant utilizes the two-step Shell Development Company Process, which offers the advantages of unusually high yields and virtual elimination of the waste-disposal problems encountered in the Chlorohydrin Process. The first step is direct catalytic oxidation of ethylene with oxygen in fixed bed reactors. Here ethylene oxide, valuable petrochemical intermediate, is produced for use by manufacturers of detergents and other surface active agents, plasticizers, solvents, textiles, drugs and many other petrochemical compounds.

The second step of the Shell Process calls for thermal hydration of ethylene oxide to ethylene glycol, essential to manufacturers of antifreeze, explosives, plasticizers, fibers, resins, hydraulic fluids and many more chemical products.



Over a half-century of Process-Industry experience

Here is just a partial list of chemicals for which Lummus has designed, engineered or constructed plants:

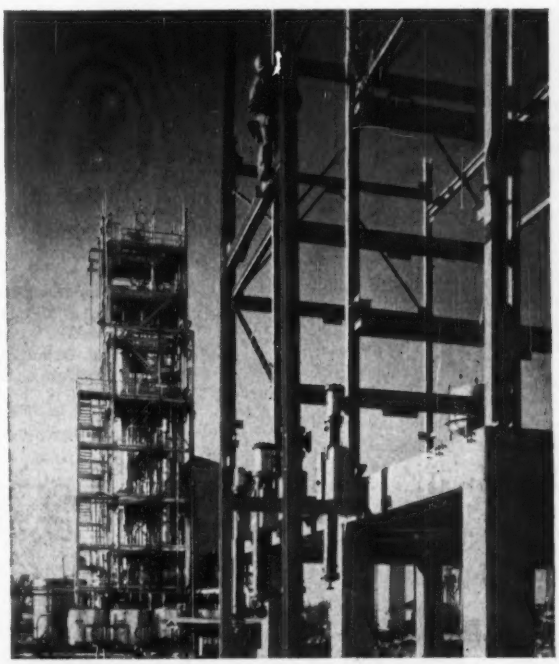
Acetone	Dichlorethane	Nitric Acid
Acrolein	Dichlorobenzene	Phenol
Allethrin	Di-Isobutyl alcohol	Phthalic anhydride
Ammonia	Ethylbenzene	Polyvinyl alcohol
Ammonium Nitrate	Ethyl Chloride	Polyvinyl Pyrrolidone
Ammonium Sulfate	Ethylene	Propargyl Alcohol
Benzol	Ethylene glycol	Propylene
Beryllium metal	Ethylene oxide	Pyrrolidone
Bisphenol	Epon® resin	Styrene
Butadiene	Formaldehyde	Sulfuric acid
Butanediol	Heavy Water	Surfactants
Butynediol	Hydrogen	Tetramer
Butyrolactone	Hydrogen Sulfide	Trichlorethylene
Carbon black	Isopropyl alcohol	Trichlorobenzene
Caustic soda	Lamp black	Toluene
Chlorobenzene	Magnesium sulfate	Uranium Oxide
Cumene	Mercuric nitrate	Vinyl acetate
Di-ammonium phosphate	Naphthalene	Vinyl Pyrrolidone

Discuss your next chemical or petrochemical project with a Lummus representative.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y., Houston, Washington, D.C., Montreal, London, Paris, The Hague, Maracaibo. **Engineering Development Center:** Newark, N.J.

Article tells when to contract for pilot plant work, when to 'do it yourself'

Reprints are available now of a four-page article which discusses factors to consider in deciding when to engage an outside firm to do pilot plant work and when to "do it yourself." The article includes a comparative analysis of costs on a specific project: (a) as actually completed by Lummus for a client and (b) if the client had undertaken the program himself. For copies, write Lummus.



MORE POLYVINYL ALCOHOL RESIN — 20 million pounds per year — will come from Air Reduction's new installation in Calvert City, Kentucky, now being engineered and built by Lummus. Shown above are Airco's original vinyl acetate monomer plant and the beginning of the new monomer plant which will double vinyl acetate output. The twin monomer plants will be the core of the huge polyvinyl alcohol resin operation, scheduled to come on stream early next year.

Visit The Lummus Exhibit, Fifth World Petroleum Congress Exposition, New York Coliseum, June 1-5, 1959

versatile

TRI SOD-IUM PHOS-PHATE CHLORINATED

it does just about everything a detergent compounder's trade asks for in a "3-way cleanser".

As a bactericide and disinfectant, Blockson's TSP Chlorinated is tops. Ditto as a bleaching-sanitizing cleanser. Encore as a deodorizing agent. TSP Chlorinated is a double salt of Trisodium Phosphate and Sodium Hypochlorite. Available chlorine content over 3.25%. Sold under private label or as an adjunct for compounded cleansers. Write for sample, technical bulletin, prices. Stocked by all Blockson jobbers.

OLIN MATHIESON CHEMICAL CORPORATION
BLOCKSON

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JOLIET, ILLINOIS
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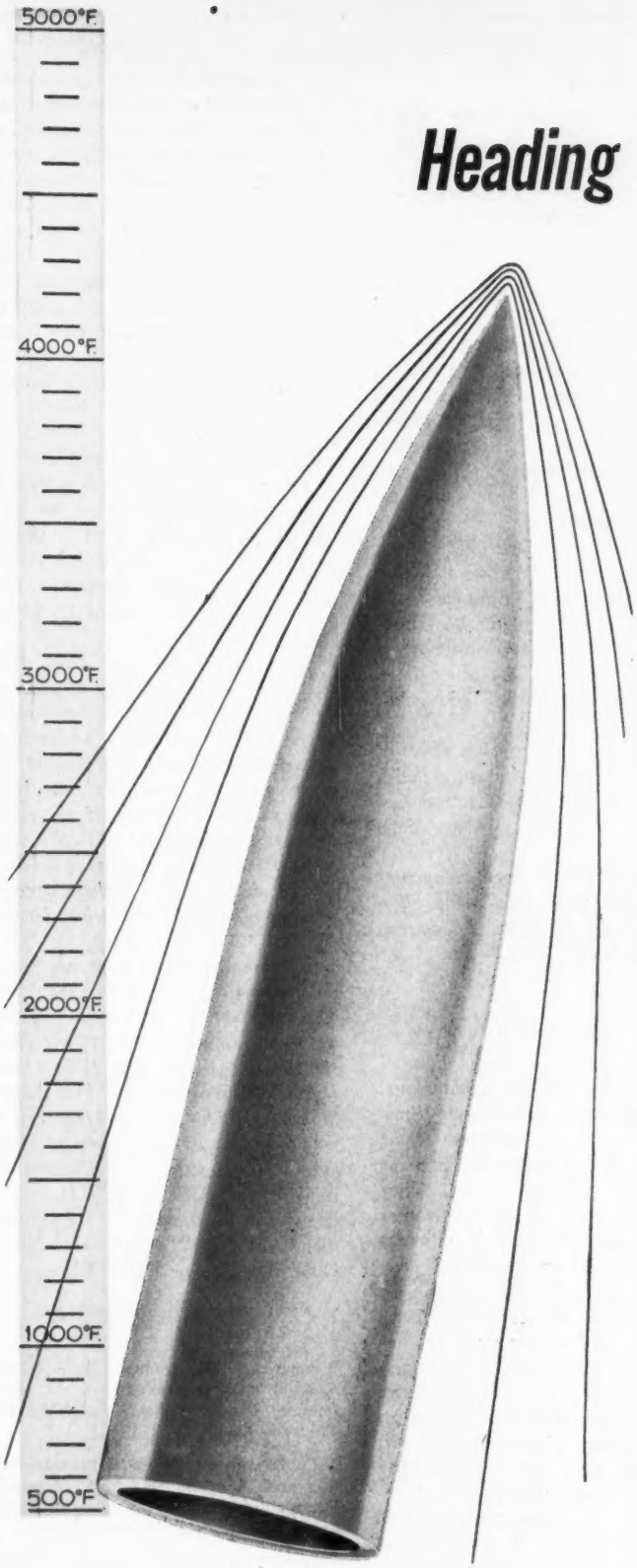

Heading for the unknown?

Check your processing requirements against Norton Fused Zirconia

You can't predict tomorrow's processing requirements. However, you can be prepared to meet many of them more efficiently and economically . . . with Norton *Lime-Stabilized* Fused Zirconia.

Consider Its Unusual Characteristics

Extremely high melting point (4,620°F) coupled with a lower thermal conductivity than standard dense refractories • Excellent resistance to thermal shock and abrasion • Not wet by most metals • Moderate electrical insulator at low temperatures and conductor above 2,200°F • Good stability in either oxidizing or reducing atmospheres.

Consider Its Many Applications

As potential material for use in missiles and reaction motors • As a support for firing highly-reactive titanates • As lining for furnaces containing high temperature gaseous reactions • For furnace parts and linings used in the metals industry • As lining and packing media for high temperature air heaters and heat exchangers • For many other critical processes.

Chances are you can improve both your processing and your production economy with this rugged, versatile material. Let a Norton Sales Engineer help. He's well qualified to discuss your precise requirements. Write to NORTON COMPANY, Refractories Division, 903 New Bond Street, Worcester 6, Mass.

Note: Norton *Lime-Free* Fused Zirconia is also available for the manufacture of refractories, as a source material for zirconium for chemicals and metals, or as an opacifier for glazes and enamels.

Melting Point	4,620°F
Maximum Usable Temperature	4,450°F
Chemical Nature	Stable
Electrical Resistivity	High Temperature Conductor
True Specific Gravity	5.6 — 5.7
Two Grain Types	Hard Dense Grains
	Bubble-Type Grains

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VIEWPOINT

RETAIL PRICE FIXING is again in the news, as sponsors of "fair trade" laws try a new tack: instead of asking Congress to pass a law that would authorize retail price maintenance on a state-by-state basis, they're pressing for an amendment to Section 5 of the Federal Trade Commission Act that would put price maintenance on a federal basis.

While the reasons for support of this move by retailers' organizations are obvious, we feel that support by manufacturers is generally a mistake—for these four reasons:

1. Discount prices and discount houses have become fashionable. The growth of the market for many of the lines of merchandise featured by discounters has been substantial; the discounters' realistic prices have meant more profits to manufacturers.

2. The setting of prices at a point high enough to keep the marginal retail establishment in business is just not good economic sense. It, in effect, penalizes the efficient retailer; it discourages consumption; it encourages private-branding.

3. The only area in which a case can be made for retail price maintenance is in prescription drugs. The need for quick availability of a broad range of prescription drugs justifies some sort of "public utility" treatment for pharmacists. But even here, a broad, any-item-at-all approach to retail price maintenance is not wise.

4. For the drug manufacturer specifically, support of retail prices is unwise. With their current public relations and legal problems over whether prices are too high, drugmakers' support of any measure that could be interpreted as a "keep prices up" move is not in their best interest.

And even if the bill under consideration is declared constitutional, we wonder whether retailers, wholesalers and manufacturers realize the degree of federal administrative control to which they would eventually subject themselves.

H. C. Johnson

Editor-in-Chief

OPINION

Not in Vain

TO THE EDITOR: An article in your Specialties section titled "Brighter Finishes Spotlight New Strippers" (*CW, Jan. 24, p. 49*) dealing extensively with paint removers points out, among other things, that methylene chloride does an excellent job in this application. We agree wholeheartedly.

But then, we should probably point out that we are prejudiced. Stauffer Chemical Co. happens to be one of the major producers of methylene chloride. You mention, fittingly enough, three of our esteemed competitors as methylene chloride producers; but somehow or other we were overlooked.

For some years, we have been busily barging chlorine down the Ohio River to feed our Louisville, Ky., chlorinated solvents plant. We shudder to think that we have toted these barges in vain or that they have escaped the attention of your alert editors.

SAM S. EMISON
Vice-President—Industrial Sales
Stauffer Chemical Co.
New York

CW's story listed three companies "among" the major methylene chloride producers; Stauffer, of course, deserves a similar listing.—ED.

Patents in the U.S.S.R.

TO THE EDITOR: Your Feb. 7 issue caught up with me in Barcelona. A comment is in order on your Viewpoint concerning U.S.-Russian trade, since it leaves the impression that the Soviets have no patent system. They do recognize the rights of an inventor to his patent; and what is more, a foreigner — even an American — can apply and get a U.S.S.R. patent. In Russia, patents are called "authors' certificates" and confer upon the inventors rights similar to those obtained from patents in other countries.

The principal difficulty is not in recognizing the rights of patents and industrial property, but in recognizing the rights of inspection and checking.

The U.S.S.R. patent also gives limited protection because it would be hard to sue the government for infringement, even if it could be proved. The problem is not dissimilar to the one encountered by our government on the subject of armament reduction. However, it is not insurmountable, as the Russians appear ready to pay a fixed sum, which could be the equivalent of a paid-up royalty. Most sellers of processes prefer that method anyway; and a factor in the price could be included if the seller suspects that he might not sell many more plants of the same type in Russia. This is not too different from sales under capitalistic economics, since, for example, most processes and plants sold by engineering firms are not covered by valid patents; and if a buyer chooses to put the time, effort and money to duplicate or improve what he purchased, he is in a position to do so.

ROBERT S. ARIES
Aries Associates, Inc.
Stamford, Conn.

CW's point was that many U.S. patents have been reduced to practice in the U.S.S.R., with no payments to the inventors. Another problem, as Reader Aries points out, deals with the inventor's right to inspect and check on use of his invention. If the seller suspects that he might not sell many more plants of the same type in Russia, he should indeed include a compensating factor in the price that he charges.

Since the publication of our Viewpoint (and the writing of Aries' letter), settlement of Du Pont's claim for neoprene know-how sent to the Russians during World War II has been revealed (CW Business Newsletter, March 14). *This may well represent a tangible effort by the Soviets to show that they will respect U.S. inventions. Whether Du Pont agrees that it is a fair price—or merely a token payment—may well affect any future know-how sharing deals.*—ED.

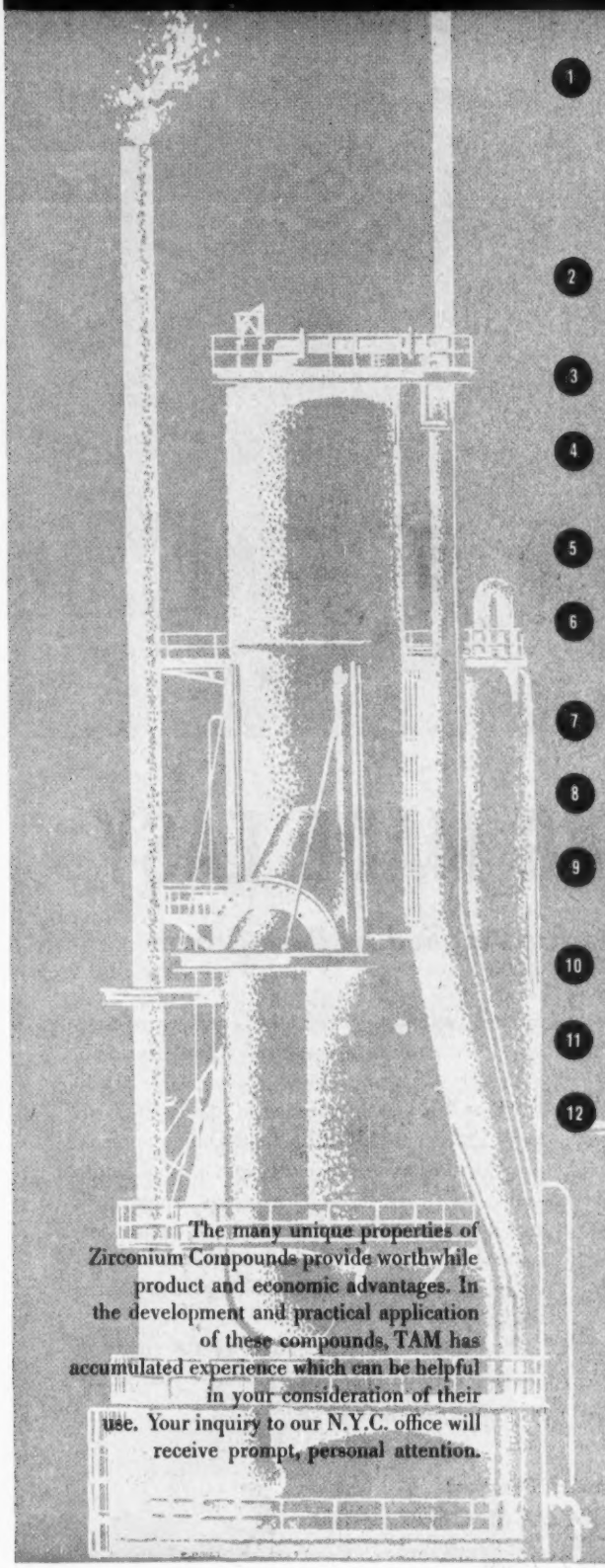
MEETINGS

American Management Assn., 28th national packaging exposition and conference, International Amphitheatre, Chicago, April 13-17.

Conference on Industrial Instrumentation and Control, Armour Research Foundation, Illinois Institute of Technology, Chicago, April 14-15.

Hazardous Cargoes Seminar, cosponsored by Marine Chemists Assn. and University of Mississippi, at University of Mississippi, April 16-17.

12 Commerical uses for Specific Zirconium Compounds



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   Ammonium Zirconyl Carbonate Solution
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   C. P. Zirconium Oxychloride
2. **Catalytic Applications**
   Zirconium Acetate Solution
   Zirconium Tetrachloride
3. **Catalytic Accelerators**
   Zirconium Sulphate
4. **Lakes and Toners, Precipitation of Dyes**
   Zirconium Oxychloride
   H. P. Zirconium Oxychloride
5. **Stabilization of Latex base paints**
   Ammonium Zirconyl Carbonate Solution
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   Basic Zirconyl Sulphate
8. **Preparation of Organic Complexes**
   Zirconium Tetrachloride
9. **Absorbent of organic and inorganic substances**
   Special Hydrous Zirconia
10. **Ingredient in poison ivy ointments**
    Carbonated Hydrous Zirconia
11. **Preparation of Anti-Perspirants**
    H. P. Zirconium Oxychloride
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POOL PAINTING MADE EASY

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Using the "Push-broom" technique, this 67,000-gallon concrete pool was painted in less than 2 hours with a Parlon-based paint. Long-handled brooms reach the high end of the pool, while short handles are adequate for shallow sections. A hand roller grooms the top edges.

This quick, labor-saving technique pays off for contractors, and is especially important to the pool owners. For when good weather rolls around everyone wants to go swimming instead of waiting for the pool to be painted.

Here is a very important and salable plus-point for Parlon-based paints. The "Push-broom" technique won't work with many other types of paint. Some have the required alkali- and wear-resistance, but cannot be applied without tiresome, costly brushing out. Others apply easily, but do not have the stamina needed to justify the cost. Only Parlon provides the right combination of properties to assure a quality line of pool paints —fast-dry, easy flowout, excellent appearance and durability, tile-smooth and nonfading, unharmed by constant submersion, resistant to pool chemicals and weathering, won't peel or blister with aging.

Plan now to get your share of the rich and growing swimming pool market. Base *your* paints on Parlon chlorinated rubber.

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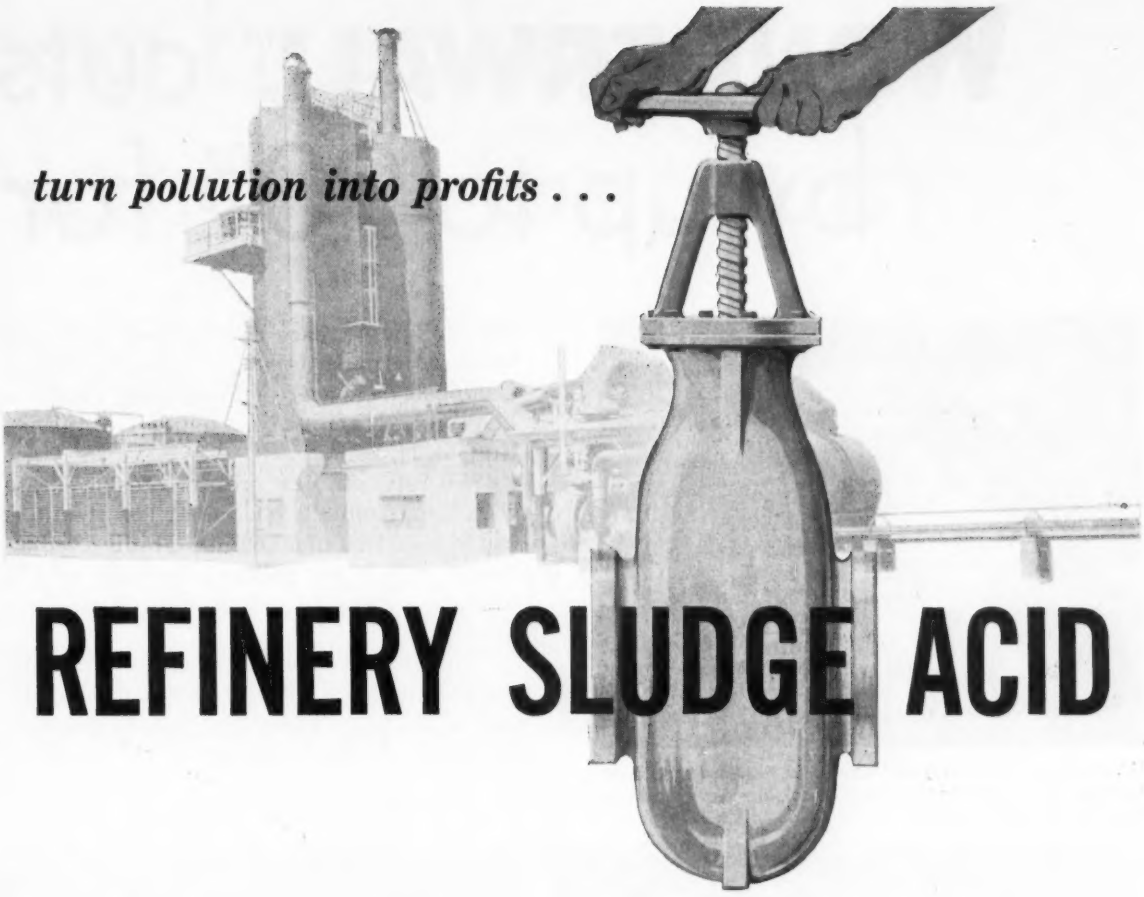

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WONDERWALL™ cuts by up to 90% for

Mr. Campbell (standing) and Mr. C. L. Pickhardt, National Gypsum transportation engineer, check on WONDERWALLS loaded in a freight car.

"WONDERWALL bags have helped us reduce breakage as much as 90%," states Mr. Robert Campbell, Manager of Packaging, Products Division, National Gypsum Company, Buffalo, N. Y.

"We estimate our present breakage rate with the WONDERWALL bag at less than one bag in a carload of 600 units. This is a reduction of 90% in our previous breakage rate in shipments going to certain difficult destinations.

"This improvement in package durability was accomplished without increasing the unit cost of the bags. There's no way to estimate the value to this company of the goodwill

The WONDERWALL places quickly on the packing spout because the Clupak extensible paper used to make this multiwall is so flexible. This flexibility also allows the bag to be handled easily.

The resiliency of the new kraft paper resists the weakening effects of plant handling, keeps the bags in better shape to withstand the shock of shipping.

bag breakage National Gypsum

gained by eliminating this sore spot in customer relations.

"West Virginia's WONDERWALL bag has won our wholehearted approval from both the performance and cost standpoints. Its success has prompted us to change bag specifications so as to use extensible type paper bags in all thirteen of our plants making plaster products."

WONDERWALL is the great new multiwall bag from West Virginia Pulp and Paper. WONDERWALLS outperform ordinary multiwall bags because they are made of Kraftsman Clupak* Paper—the new, extra tough kraft that stretches. WONDERWALLS pack faster, handle easier and stack better, too.

Try this superior, new multiwall. Order a trial shipment of 5000 WONDERWALLS on your next carload. Write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N.Y.

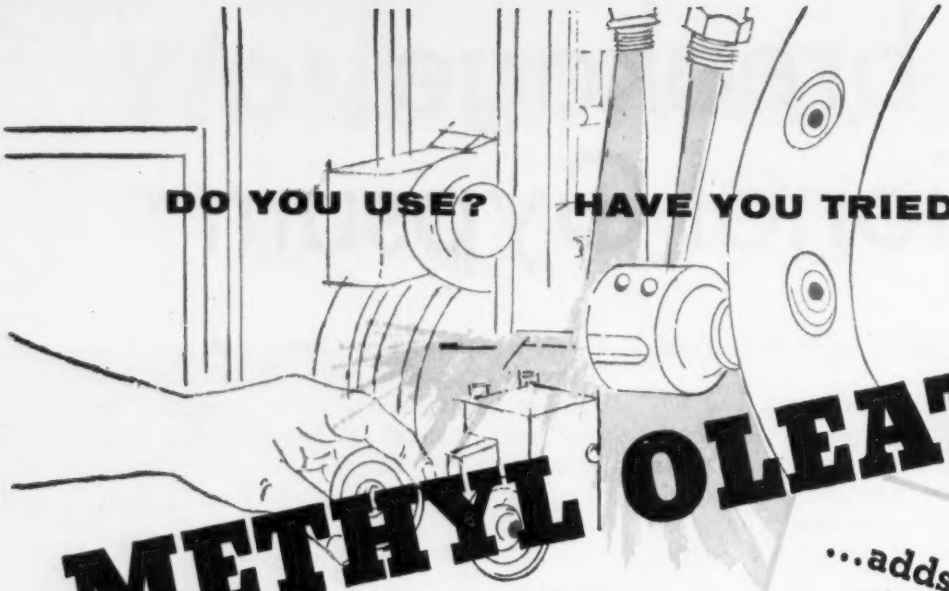
See it at our exhibit,
AMA Packaging Exposition, Chicago

West Virginia Pulp and Paper

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

In some cases National Gypsum stores the bags before shipment, stacking them three to four pallets high. This places a 6000 pound pressure on the bottom bags, but the extra tough WONDERWALLS do not break.

WONDERWALL
Best bag of all



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If you are presently using Methyl Oleate our new Methyl Ester plant at Millsdale (Joliet), Illinois assures you of volume production from a centrally located source. This may afford you substantial savings as well as providing you with a product of high purity and excellent uniformity. If you are presently using fatty acids, you may find for a number of applications that Methyl Oleate can do a better job for you. Among its advantages are better stability...won't break emulsions; low odor...won't become rancid; more reactive...for lower costs; and it is non-corrosive.

Other Methyl Esters. Also available are other pure methyl esters from coconut oil including Methyl Palmitate, Methyl Myristate, Methyl Laurate, and mixed Methyl Caprylate-Caprate.

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Lube oils, cutting oils, grinding compounds. Methyl Oleate can be sulfurized to make EP additives for lube oils and cutting oils or used as is in synthetic type cutting oils and grinding compounds.

Rolling oil formulation. You will find Methyl Oleate an effective "oiliness" additive in rolling oil formulations.

Drawing oil formulations. If you would like an excellent polar additive for drawing oil and drawing compound formulations you may find Methyl Oleate your answer.

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AMERICA'S MOST COMPLETE LINE OF SURFACTANTS

Business
Newsletter

CHEMICAL WEEK
April 11, 1959

Lithium producers are stepping up their diversification programs as the U.S. Atomic Energy Commission—their biggest customer—continues to withhold any hint about its intentions on future lithium purchases.

Ready to go farthest afield in diversification: Lithium Corp. of America (Minneapolis), which has been negotiating for acquisition of two companies that are definitely not in the CPI:

- American Ice Co. (New York)—manufacturer of ice and distributor of ice, coal and fuel oil in six large Atlantic Coast cities.

- U.S. Cold Storage Co. (Chicago)—refrigerated storage and warehouse operator in various Midwest cities.

So far, LCA—which would be hard hit by an AEC moratorium on lithium buying because it is virtually 100% engaged in lithium operations—has acquired 11% of U.S. Cold Storage common stock (for LCA stock whose current market value is about $615,000); and has an option to buy (for about $5 million) more than 50% interest in American Ice.

If the American Ice deal goes through—and terms of the option call for LCA to make up its mind by May 31—LCA will have outright control of American Ice, and expects also to have working control of U. S. Cold Storage. Reason: American Ice owns about 40% of U.S. Cold Storage's outstanding common stock. A well-known chemical consulting firm is studying the problem; and if the recommendation is to take up the option, the plan is to merge all three concerns under the LCA corporate name.

LCA says its interest in merging with such companies is to improve its own financial position and obtain support for further research and development and expansion in its own fields—lithium, lithium perchlorate, and light metals other than lithium.

•

Some new fertilizer competition may shape up in the Caribbean, as a result of the opening of the St. Lawrence Seaway this month (*see page 21*). And there's an amusing twist to the competition.

One of the ship lines using the Seaway will be Grace Line, a W. R. Grace & Co. subsidiary, whose freighter *Santa Regina* is contending for the honor of being the first ship to transit the new channel. Grace Line has an operating-differential agreement with the U.S. Maritime Administration for service on trade route 33, between the Great Lakes and the Caribbean. The agreement permits Grace ships to pick up cargo at Canadian ports.

Several weeks after the new Seaway is opened to seagoing ships, Cyanamid of Canada expects to start up its urea plant at Hamilton, Ont. Cyanamid hopes to export much of this plant's production, largely to the U.S. and Caribbean countries.

But W. R. Grace & Co. is a partner in a $12-million fertilizer plant being built on Trinidad, in the Caribbean. The unit will be completed late this year, and one of its principal products will be urea (*CW Business Newsletter, July 26, '58*). Thus Grace-vs.-Cyanamid urea competition is shaping up in the Caribbean—and it's possible that Grace Line will be hauling the product for both producers.

•

The Royal Dutch/Shell Group is revamping its toplevel chemical and petroleum organizations. The two major operating arms, Shell Petroleum Co. Ltd. and Bataafsche Petroleum Maatischappij N.V., will become essentially holding companies. Taking over and integrating operations will be two new subsidiaries for each company. Shell International Petroleum Co. and Shell International Chemical Co. (London); and Bataafsche Internationale Petroleum Mij and Bataafsche International Chemie Mij (The Hague). The two chemical subsidiaries will actually function as a single unit, coordinating and making top policy decisions for the subsidiary production companies. The new organization was set up, in large part, to cope with the group's rapid growth in chemical sales, which have risen at an average rate of 19%/year during the past five years, now account for about 8% of the group's $7-billion sales. Operations in the U.S.—Shell Oil and Shell Chemical—will not be directly affected.

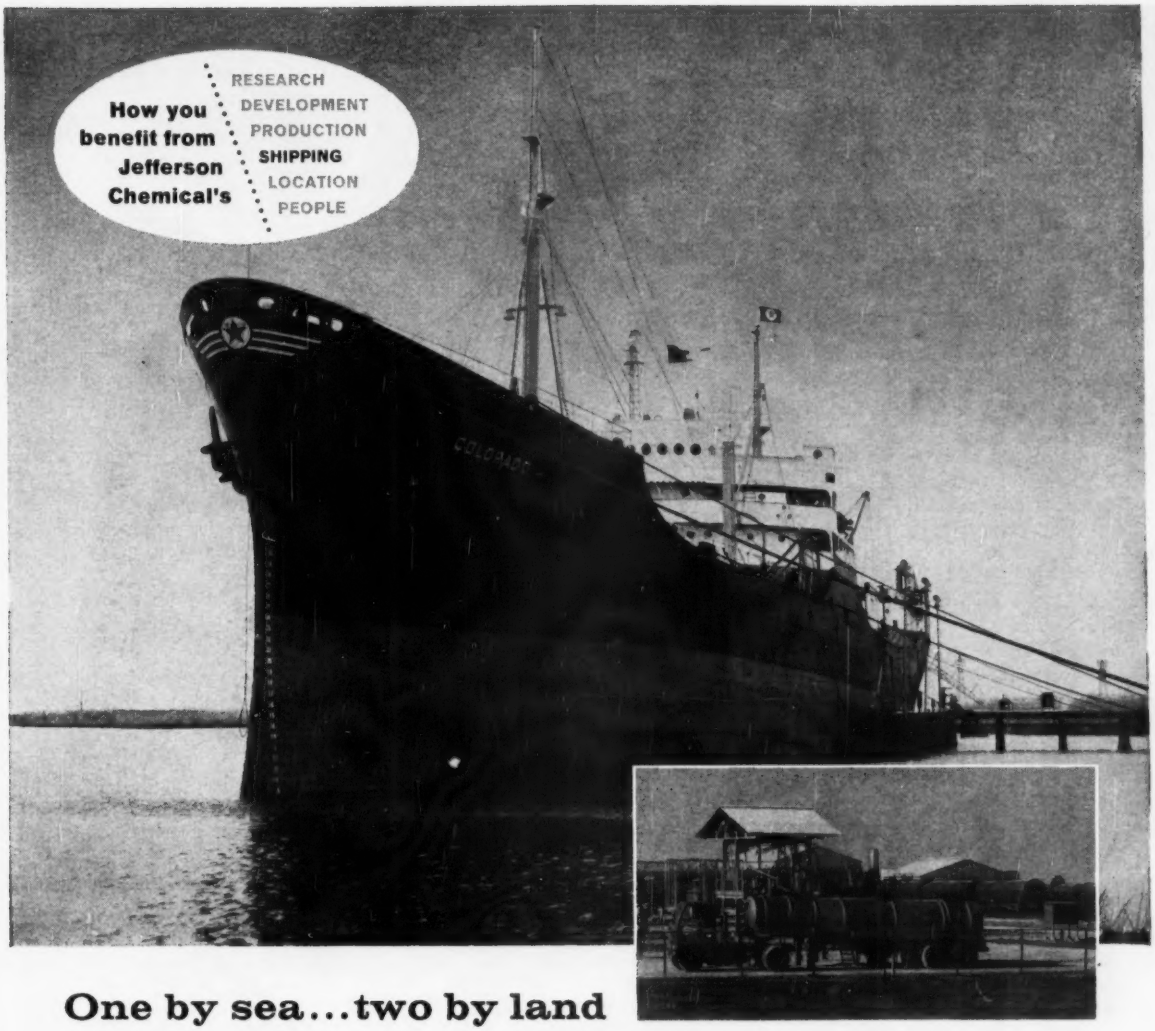
•

Add General Dynamics as a possible buyer of General Aniline. Interhandel, owner of the chemical company, confirms that it is seriously considering several U.S. offers and is after a quick settlement. General Dynamics reportedly has offered $130 million for Interhandel's 93,000 shares in General Aniline, half in cash, the rest in its own stock. General Dynamics—whose policy is neither to confirm nor deny such rumors—has been reported seeking to balance out its military business by buying into other industries.

•

Overseas sales are keeping profits bright for the big soapmakers. For Colgate-Palmolive, total sales rose 5.3% last year, to $534 million, Almost all of this rise reflects the boom in overseas sales, which shot up 10.3%, to $262.7 million. Domestic sales were up barely 1%. Sales to Great Britain and continental Europe ($120.1 million) account for the biggest chunk of Colgate's foreign sales. The Western Hemisphere took $112.4 million; the Far East and Africa, $30.2 million.

For Unilever, soap and detergent profits from continental Europe showed marked gains, and gains in the U.S. were substantial, too. Total tonnage—Lever does not make area breakdown—was unchanged from '57, but value of sales increased from $781 million to $914.8 million. Unilever's total profits were up 7.6%, to $257 million on $4.8 billion sales. Soaps, detergents, margarine and some frozen food revenues accounted for most of the rise.



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Jefferson's plant is ideally located on the industrial Gulf Coast near Port Neches, Texas to ship your chemicals by the most economical carrier. Jefferson's private docks on the deep-channel Neches River accommodate large tankers destined for world ports. Equally good are the highway and rail networks for tank and drum shipments overland.

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Jefferson chemicals are tested at each stage of handling, from manufacture through storage and loading. And to keep your shipments arriving with "plant purity", special emphasis is placed on the quality of materials and linings in all containers . . . tank cars and tank trucks are thoroughly cleansed before each loading. Every care is exercised to assure you of full-measure, high purity chemicals on delivery.

In addition to direct-from-plant shipments, Jefferson maintains convenient stock points at Toledo, Ohio, Paulsboro and Tenafly, New Jersey, Chicago, Houston, Charlotte, and Los Angeles. Let Jefferson's extensive experience in the proper storage, handling, and shipping of chemicals work for you.

JEFFERSON CHEMICAL COMPANY, INC.

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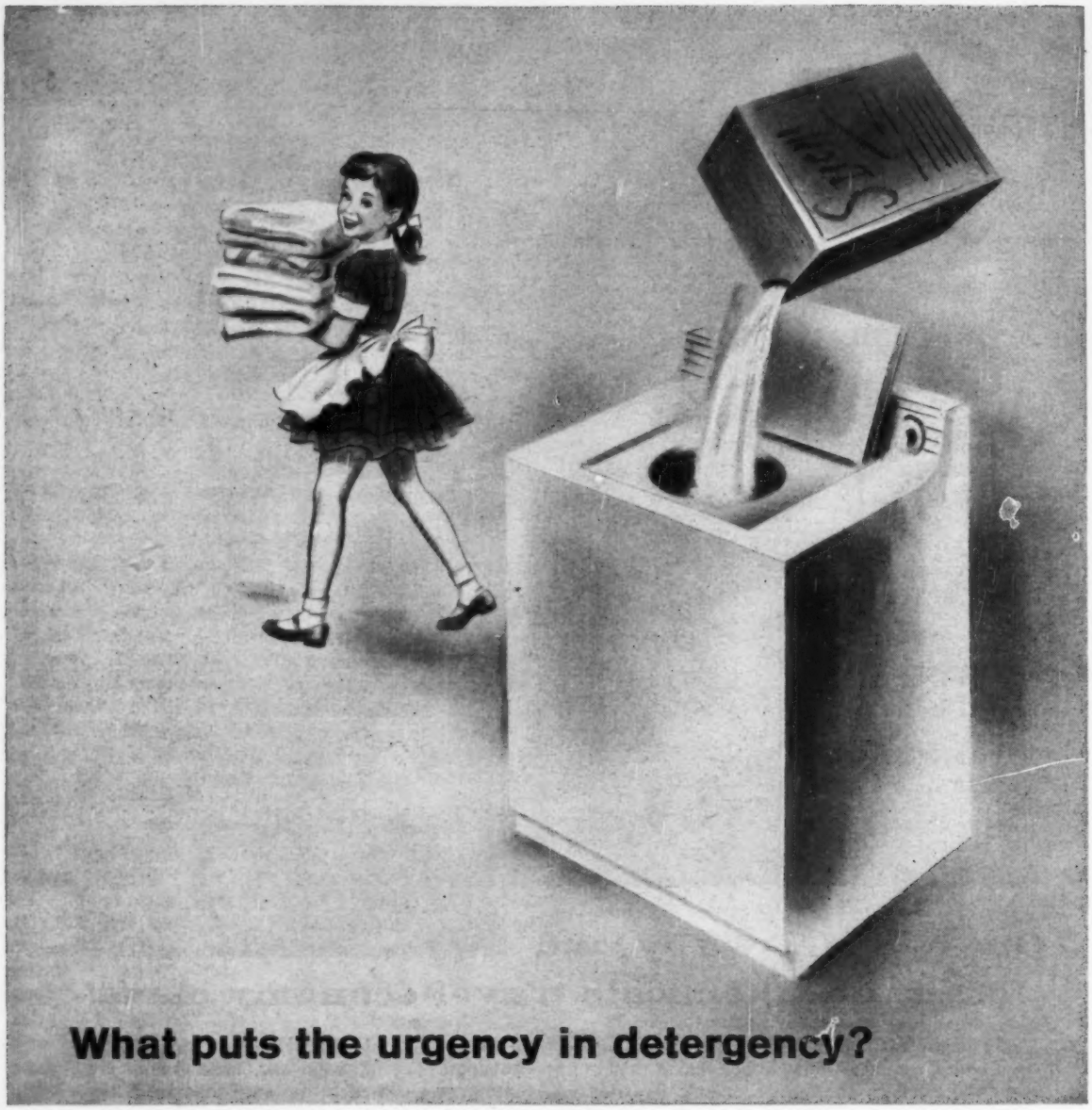
126



What puts the urgency in detergency?

What is it about that modern miracle-in-a-package that makes it wash so clean . . . so fast? The magic ingredient is STPP (sodium tripolyphosphate), a hard working phosphate chemical. In detergents and soaps, STPP not only *softens water* but also boosts *cleaning power*—eliminating deposits normally formed with soap, and acts as an *emulsifier*.

Sodium tripolyphosphate, one of the many fine phosphate chemicals produced by Virginia-Carolina Chemical Corporation, has a wide variety of uses. You'll find it on the job in industries ranging from food to porcelain enamels. Typical STPP applications include: floor and wall and other cleaners; water treatment for heating, cooling and irrigation systems; drilling muds for oil well drilling. Perhaps this versatile phosphate chemical can help you improve your product or process. Why not investigate?

Like all V-C phosphate chemicals STPP by V-C means finest quality and purity—the end result of V-C's integrated operations. V-C has complete control—from mining *its own* phosphate rock . . . on through production to *non-contaminated* delivery in V-C trucks. Get full details from your V-C distributor, or write:

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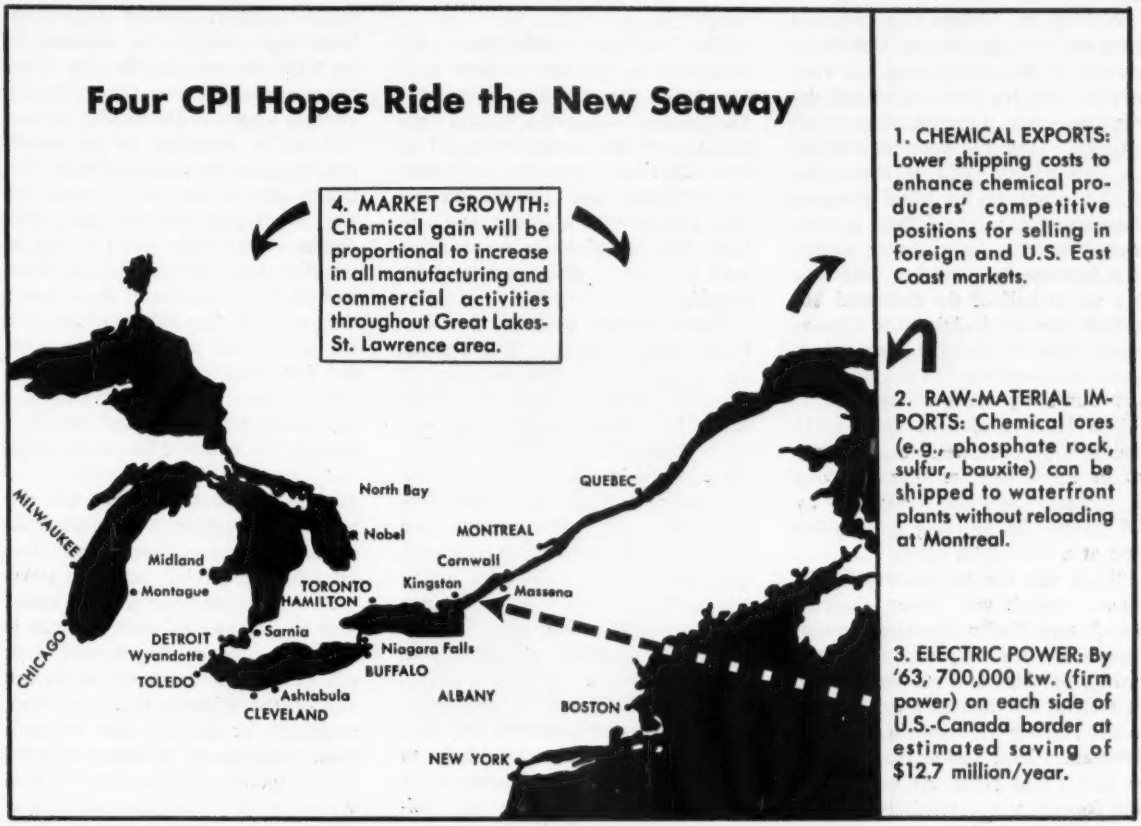
Four CPI Hopes Ride the New Seaway
4. MARKET GROWTH: Chemical gain will be proportional to increase in all manufacturing and commercial activities throughout Great Lakes-St. Lawrence area.
1. CHEMICAL EXPORTS: Lower shipping costs to enhance chemical producers' competitive positions for selling in foreign and U.S. East Coast markets.
2. RAW-MATERIAL IMPORTS: Chemical ores (e.g., phosphate rock, sulfur, bauxite) can be shipped to waterfront plants without reloading at Montreal.
3. ELECTRIC POWER: By '63, 700,000 kw. (firm power) on each side of U.S.-Canada border at estimated saving of $12.7 million/year.
MILWAUKEE
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Seaway's Four-Way Business Boon

For U.S. and Canadian chemical companies producing and selling in the Great Lakes and St. Lawrence River areas, the historic opening of the St. Lawrence Seaway about April 20 may well usher in a new era of regional prosperity.

The Seaway — a reality at last, after more than 60 years of vociferous controversy — will bring new opportunities in transportation and marketing to manufacturing, commercial, agricultural and service industries throughout large sections of the two countries. Chemical companies, with scores of plants and warehouses and hundreds of principal customers along the waterfronts there, are sure to reap important benefits. But no one expects much change in 1959.

Last week, executives of company after company told *CW* substantially the same thing: that the Seaway will not abruptly alter their present operations. "We'll have to wait and see what develops," a Du Pont spokesman said. "The extent to which we can utilize the Seaway will depend on freight rates, routes and frequency of sailings, types of ships available, and market conditions for each commodity. All these factors are in transition stages now."

Scouting the Prospects: But chemical companies with an interest in the area are diligently scouting the possible advantages of using deepdraft shipping there. Remarked an official of one Great Lakes city's Chamber of Commerce: "These chemical companies won't say much publicly about what they're doing. But we've had many queries from them."

Most of the companies' work on utilizing the Seaway is still in the "study and survey" phase. But several have been building dock facilities, and at least one is planning to try to test the economics of a new routing for its incoming raw materials.

Other chemical concerns have been optioning, leasing and buying waterfront sites, or expanding their existing plants and warehouses in anticipation of bigger sales volume in coming years. An executive of one Chicago-based company told *CW* his

concern has no plans for buying waterfront land for a warehouse, then quickly added: "But that could change tomorrow because we have many new products and are always enlarging the scope of our operations."

Making the Means: One chemical company that has already started investing in means of using the Seaway is Dow, for years a leader in developing water shipment of chemical products. Dow has completed building an 850-ft. dock at Bay City, Mich.; plans to do more dredging there as soon as the federal government deepens the channel leading into Saginaw Bay; and has offered to pay up to half of the estimated $8-million cost of dredging the Tittabawassee River so that 7-ft.-draft barges could be towed between Saginaw Bay and Dow's big works at Midland.

The latter project, according to preliminary estimates, could carry up to 1.2 million tons/year, saving Dow about $450,000/year; and by '75 might be carrying 2.7 million tons at a $1-million saving.

"Dow will use the Seaway to the extent that it will lower shipping costs," says Traffic Manager Gordon Anderson. He expects substantial savings in shipments via the Seaway to Britain and northern Europe; up to now, nearly all Dow shipments to those areas have moved from Detroit or East Coast ports. Anderson feels that frequency and regularity of Seaway sailings will be as important as freight rates.

Cost-Cutting on Raw Materials: Two leading Canadian companies also are investing in port improvements geared to the Seaway. Du Pont of Canada is continuing a port project at Maitland, Ont.; last fall, it connected a semipermanent pipeline there to take on liquid raw materials from deeper-draft vessels, and it eventually hopes to build docks to handle solid materials from bigger ships.

At Hamilton, Ont., Canadian Industries Ltd. plans a dredging operation to accommodate seagoing freighters. And CIL intends to try bringing in sulfur and phosphate rock — its biggest-volume imported raw materials — in deepwater ships via the Seaway. These minerals have come up from the Gulf of Mexico in two ways:

- Up the Mississippi to Chicago and then across the Lakes to Canadian ports, all on barges.
- Up the Atlantic Coast in ocean vessels to Montreal or Sorel, then reloaded onto canallers that could clear through the old St. Lawrence waterway.

The company won't know the economics of the new method until it's billed for the first shipments. Management is hopeful, but isn't expecting any spectacular savings. Two other Canadian companies — Dominion Fertilizer and Electric Reduction, both at Port Maitland, Ont., on Lake Erie — also are constructing dock facilities to accommodate larger vessels.

Toting Potash to Baltimore: For International Minerals & Chemical, the Seaway is a possible boon in connection with the large new potash mine IMC plans to open next year near Yarbo, Sask. Assistant Traffic Director Walter Knorst says that shipping potash by rail to Fort William, Ont., on Lake Superior, and then by ship through the Seaway and down the Atlantic Coast might enable IMC to meet East German competition at Baltimore.

Several Canadian plants' exports may be boosted by the Seaway. Cyanamid of Canada is completing at Hamilton that country's first urea plant, and exports — particularly to Caribbean and European countries — bulk large in plans for this unit. Polymer Corp., synthetic rubber producer at Sarnia, exports 50-60% of its entire output. And Imperial Oil thinks it may be able to step up exports of its synthetic detergent chemicals.

And Armour & Co.'s Chemical Dept. indicated it has ideas for using the Seaway to bring big-volume raw materials — such as nitriles and vegetable oils — to its plant near Chicago.

Other Industries to Benefit First: But there's general agreement among chemical companies' transportation executives that other industries will reap primary benefits from the Seaway. They figure that ship lines will be most interested in serving big-volume shippers of bulk materials such as grains and iron ore.

In this vein, IMC's Knorst remarked: "We think the ship lines will skim off the high-grade traffic first, then come to us fellows with smaller volumes and — if they have any excess capacity — talk to us about it. The Seaway won't mean much in the next two years for the shipper of low-grade, low-cost commodities."

The ship operators' real or imagined favoritism toward big-volume bulk-cargo materials is expected to limit the Seaway's benefits for Great Lakes industries. One Ohio chemical concern says it might be able to save 70¢/ton by bringing in a certain raw material in seagoing vessels, but figures that it just won't work that way — at least not this year. The deeper - draft ships will continue to transfer that raw material at Montreal or Sorel because at those points the big ships can take on Canadian wheat or other profitable bulk cargo for their return trips.

Other drawbacks: few St. Lawrence and Great Lakes harbors are deep enough to handle 27-ft.-draft ships, and dredging jobs are costly*; and even at 27 ft., the Seaway will not be deep enough to handle many of the larger freighters and tankers that are more economical for some tasks.

Either the Seaway will be closed four to five months each year, as is now the case, or the Seaway tolls will have to be increased to finance any of the schemes that have been advanced for keeping the channels from freezing up in winter months.

And though President H. W. Von Willer of the Erie Railroad is predicting that bulk cargo — principally grain and iron ore — will take up virtually all the capacity of the Seaway's locks, chemical management men are not ignoring the possibility that the Seaway may bring stepped-up imports of chemicals from their European rivals. British shipping lines reportedly are offering "bargain basement rates" on general cargo (packaged and manufactured goods) from English ports to Toronto; and it's a big question what chemicals in what quantities will come in at those rates.

Nevertheless, chemical company executives are generally optimistic about the Seaway — their hopes rest mainly on expectations of a general upturn in business activity in the entire Great Lakes area.

* Montreal's nearly completed five-year port improvement program—including a deep channel across the harbor, additional piers and new transit sheds to speed cargo handling—is costing $56 million.

Heyden Newport Grades Up for Profits

Heyden Newport Chemical Corp. is beginning to enjoy the fruits of its long-range research and diversification program. Its new synthetic jet lubricant is a leading contender for some hefty military contracts (CW, April 4, p. 83); its synthetic pine oil plant is just now onstream; and its new herbicide is slated for worldwide distribution by Du Pont.

Long bound up with the erratic market cycles of "commodity chemicals" such as formaldehyde, pentaerythritol, methanol, naval stores, the company was stung hard by recession price drops. On sales of $47.9 million, profits were down 35%, to $2.6 million.

But with prices firming, and "a better blend of sales" beginning to flow in from new products, President Simon Askin is happy with his sales outlook.

Long Road: Heyden Newport's self-stirring into more vigorous activity has been a long, gradual process, starting in 1949 after the death of B. R. (Barney) Armour, president of Heyden Chemical Corp. Until then, Heyden had been classed as an old-line, one-man operation.

When Armour died, Heyden's management (it was run by a committee until Askin took office three years later) began shucking off the dead weight.

First to go was Heyden's subsidiary, Rumford Baking Powder, which was making no money.

Next, Heyden spun off its small Memphis caustic-chlorine plant, which was costing $300,000/year.

Major Decision: Then, in Oct. '51, after merger talks failed, Heyden sold its 25% interest in American Potash.

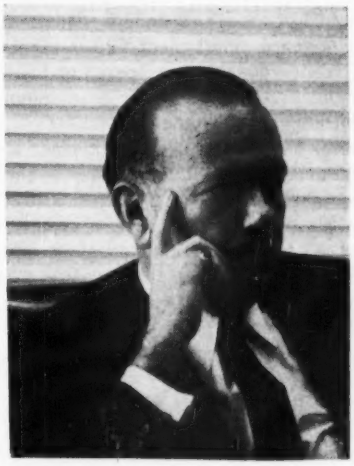
A month later, Heyden dumped its Jamieson Nyal line of proprietary drugs, relieving itself of another $100,000/year of losses.

Finally, at the end of '53, Heyden's management freed itself from another inherited burden.

During 1941-42, the company had been preparing to launch into citric acid production, and was actually turning out several tons a week from a pilot plant in Garfield, N.J.

Then, in '43, Armour made what one Heyden executive today calls "another sad decision." He decided to scrap the citric acid plans, and plunge the entire plant and personnel into producing penicillin and eventually streptomycin and neomycin. It was profitable for awhile, but by '52 the market had fallen apart, and Heyden was losing $600,000/year.

In '53, after having developed tetracycline, Heyden was able to sell the whole antibiotic division to American Cyanamid for $13 million—"far more than its book value," Askin says. On balance, the antibiotic venture had made the company a lot of money, but had cost it a citric acid position.



President Askin aims to integrate out of unstable heavy-chemical markets.

Turn About: While Heyden was cutting away its dead limbs, it was also looking around for the best way to build itself up. In Dec. '52, Heyden decided to join Monsanto in building a 25-million-gal./year methanol plant—a step, Askin says, "we should have taken years ago." Methanol, the biggest item on Heyden's raw-material list, went into its formaldehyde and pentaerythritol output.

The plant was slated to be in commercial production by Jan. '55. But, so far, plagued by continuing startup trouble, it has been producing little but grief (*see p. 24*).

With Cyanamid's $13 million in its pockets, Heyden began looking around for a good way to spend it.

Pick Up: The first acquisition was Nuodex Products Co. in '54, which Heyden picked up for $2.8 million. Then, in '56, Heyden merged with Newport Industries through a one and one-half-for-one stock exchange and became Heyden Newport.

Before the mergers, Heyden's products (principally formaldehyde, pentaerythritol, salicylates, chlorinated aromatics) were going primarily to the surface-coating and plastics industries, with some sales for drugs, dyestuffs, and food processing.

The Nuodex line complemented Heyden's in surface-coating chemicals, and rounded out Heyden's plastics chemicals business. Nuodex was putting its emphasis on vinyl additives, with a line of heat stabilizers. Today, Nuodex is the company's fastest-growing division.

But the merger with Newport really opened up new opportunities for Heyden. Newport basically was a naval stores producer (second in size to Hercules), but had stepped into the aromatics field with products like menthol and camphor, and into specialty chemicals for synthetic rubber. Newport also gave Heyden entry into the paper and mining industries; its pine oil goes into flotation agents and heavy-duty detergents. And with its paint chemicals, it was already reaching many of the same customers served by Heyden.

Askin and his executive vice-president and research head, Herman Sokol, expect to ease away from the turbulent naval stores market, upgrading Newport's rosin and turpentine for more stable—and profit-yielding—specialty chemical sales.

The emphasis at Newport right now is on rubber and synthetic polymer chemicals, which hold the greatest immediate potential. Its rubber chemical sales are already "a multi-million-dollar affair."

Sokol also believes the Newport division has a big future in chemicals for the mining industry. The new synthetic pine oil plant, which just went onstream at Pensacola, will turn out specialty compounds for nonferrous ore flotation processes as well as detergent and disinfectant producers. When it can muster the manpower, the company will set up a mining development program to "target unresolved problems." Lab

work in the area has already started.

Strobane, the insecticide Heyden Newport recently acquired from B. F. Goodrich Chemical, is another example of the company's program. After field testing this year, it will be pushed for livestock and major crop applications, and could develop into an important area for Newport terpenes and Heyden chlorination know-how.

Research Push: Expanded research has been the backbone of the upgrading program. Between '48 and '58, the firm's combined outlays rose from $750,000 to $1.3 million.

One of the most important products to come out of its labs is its trichlorobenzoic acid herbicide, which it began selling last year after four or five years of research. Marketing, which requires a large, specialized sales force, is being handled by Du Pont in the U.S. and abroad. Agreements have recently been reached with a British producer to make the herbicide for European distribution. . .If its synthetic jet lubricant wins military approval this year, Heyden expects this field to mushroom into a "multimillion-dollar" outlet for Heyden pentaerythritol and other polyols. Confidence has run high enough to spur a semiworks plant, now going up at its Fords, N.J., plant. Askin and Sokol expect to put up a full-size plant within the next three years.

Spread and Focus: For Askin, welding Heyden Newport's separate parts into a coordinated, growing whole has been a process of balancing centralization with the advantages of division concentration, promoting division spirit along with the "big family" feeling. Research in the three labs is centralized in a combined research committee. And a centralized market development group helps direct research, handles preliminary marketing, justifies new plants.

But while the division heads, as corporate officers, are in on the corporate profit-sharing plan, the executives under them come under their divisions' incentive programs. And sales are largely decentralized.

Within the past few months, the sales organization has been reorganized. Each division now has several product managers, who report to the division sales manager. Their job will be pushing the new specialty products on which Heyden Newport is pinning its hopes for greater growth.

Red Plants for Iraq

As the iron-fisted regime of Iraq's Premier Abdul Karim el-Kassem falls under Communist domination, Russia is fast reinforcing its Middle East position by undertaking a huge construction program, including several chemical projects.

Under a $140-million technical and economic aid agreement with Iraq, Russia will set up 25 plants, providing all equipment and technicians. Equipment for most of the plants is scheduled to arrive in 1961-62. Some 80 Soviet experts have already gone to Iraq.

Three chemical plants and a glassware plant are definitely slated: a nitrogen fertilizer plant, with a capacity of 60,000 tons/year of ammonia, 100,000 tons of ammonium nitrate and ammonium sulfate for local and export markets; a plant to produce 65,000 tons of sulfur and 110,000 tons/year of sulfuric acid; a glassware factory with a capacity of 83 tons/day of molten glass; and a pharmaceutical plant.

The pharmaceutical plant, to be delivered in '61, will also be operated by Soviet technicians. It is said to have a yearly capacity of 5.5 tons of penicillin; 5.5 tons of streptomycin, 6.5 tons of other antibiotics. It will also turn out various vaccines.

In addition, until the plant is built, Russia has pledged to supply all of Iraq's requirements of medical and surgical equipment.

More projects are under study, including a caustic soda plant (capacity: 22,400 tons of caustic, 20,000 tons of chlorine), and a 40,000-tons/year plastics unit.

Solids for Celanese

Celanese Corp. is taking its first light steps into the solid rocket fuel field.

Right now, Celanese has no specific plans, but feels "we have a place in the field but we don't know what it is yet." To try to find out, Julius Zeigler, its new manager of high-energy materials operations, will establish exploratory contacts with military agencies, then make recommendations to Celanese management.

A move into solid fuels, Celanese says, would be a logical extension of the company's present work with polymers and other synthetic organic chemicals—such as acrylate esters—which may go into future fuels.

Zeigler, formerly chief of chemicals, propellents and explosives engineering development for the Army's Ammunition Command, will eventually set up a group aiming at developing fuels and improving Celanese's position as a supplier to other fuel makers.

Round One for Kellogg

M. W. Kellogg has won an important first-round decision in its law suit with Monsanto and Heyden Newport. In a New York court last week, Justice Thomas Aurelio granted Kellogg's motions to compel arbitration of the chemical companies' claims against Kellogg. He turned down Monsanto's bid to have the issues decided in court.

The legal battle began last January in Delaware. Monsanto and Heyden Newport brought suit charging Kellogg with negligence and fraud in claiming it had the know-how to build the companies' jointly owned $6.5-million Texas City methanol plant *(CW, Jan. 17, '59, p. 23)*. The companies asked for $9.5 million in damages resulting from equipment failures, which allegedly caused a 2½-year delay in operations. Kellogg immediately filed a countersuit in New York, demanding arbitration, as specified in the contract.

Next, the chemical companies filed a petition asking for a restraining order against Kellogg's countersuit. That failed; so then Monsanto came to the New York court with a request for a stay of arbitration in New York until the suits in Delaware were settled.

In his decision last week, Judge Aurelio pointed out that he was not ruling on the merits of Monsanto and Heyden Newport's original claims against Kellogg.

But, he said, the arbitration clause in the contract between Monsanto and Kellogg was broad enough to cover the issues, and it had never been waived. Moreover, Heyden Newport, even though it did not sign the contract, was represented by Monsanto, and thus was a party to it.

Monsanto said it will appeal the decision in the New York state supreme court's appellate division.

COMPANIES

National Starch Products plans to change its name to National Starch and Chemical Corp. to reflect "the increased importance of chemical products and processes in the company's business." Change would become effective May 8 if stockholders approve. The company's primary interests will continue to be starch products and adhesives.

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Union Carbide Olefins Co. division has turned over its business of designing solvent recovery plants to Vulcan-Cincinnati, Inc., an engineering and construction firm. Major reason for Carbide's dropping the business: it does not manufacture equipment. Carbide will continue to sell activated carbon for recovery purposes and will service recovery equipment already installed.

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Cerro de Pasco Corp. has purchased Consolidated Coppermines Corp. for Cerro securities and cash worth a total of over $35 million. The purchase brings Cerro's assets to some $240 million; half are in the U.S. and Canada, the rest in Peru and Chile. With Consolidated, Cerro got $23 million in cash and marketable securities and controlling interest in Titan Metal Manufacturing Co. and the Rockbestos Products Corp.

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St. Regis Paper Co. has filed for registration of 58,000 shares of its $5-par common stock. The paper company will swap the stock for at least an 80% interest in Cupples-Hesse Corp., tag and envelope maker.

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National Aluminate Corp. will change its name to Nalco Chemical Co. if stockholders approve at the April 27 meeting. It also seeks to increase authorized common shares from 1½ to 3 million. The new name, under consideration for several years, will emphasize that Nalco's services and products "are available to all industries using chemicals."

EXPANSION

Laminated Plastics: Cyanamid of Canada will spend more than $1.5 million to convert its St. Jean, Que., facilities for producing Formica laminates. Cyanamid bought the plant last summer from St. Regis Paper Co., which was producing a competitive laminate. Canada represents a $10-million market for laminates.

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Liquid Gas: Union Carbide's Linde Co. division has completed the major construction phase of its $5-million liquid oxygen and nitrogen plant at Pittsburg, Calif. It's due onstream by June 1, will turn out about 115 million cu. ft./month. When it hits full operation in early '60, output will go up to 216 million cu. ft./month.

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Specialty Chemicals: Polymer Industries, Inc., Philip Morris subsidiary, is spending $500,000 to double facilities of its Springdale, Conn., plant. Polymer makes adhesives and textile chemicals.

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Pharmaceuticals: Merck (Rahway, N. J.) has opened a branch in Portland, Ore., to distribute pharmaceuticals and chemicals in Oregon, Washington, Alaska and parts of Montana and Idaho.

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Tires: Pennsylvania Tire Co., wholly owned subsidiary of Mansfield Tire & Rubber Co., will put up a $15-million tire plant at Tupelo, Miss. Construction will probably start in the fall. Initial output will be 1,500 tires/day; the plant can be expanded to 5,000-tires/day capacity. About 125 employees will be required.

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Cement: Dundee Cement Co. is stepping up construction of its $30-million cement plant at Monroe, Mich. It now hopes to start preliminary production by October of this year, although the plant won't be completed until May '60.

FOREIGN

Sales/England: Imperial Chemical Industries Ltd.'s consolidated sales for '58 held level at the $1.3-billion mark reached in '57. But after-tax profits slipped from $80.6 million to $66.6 million. Profits before taxes were $124 million. ICI's profit margin has been falling during the past two years, to 8.7% in the last half of '58, compared with 10.9% in the '57 period.

British Nylon Spinners, jointly owned by ICI and Courtaulds, is going ahead with expansion plans, despite the 50% drop in profits last year. They slipped from $27 million to $13.6 million, before taxes. Net profit after taxes was $8.3 million.

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Petroleum/Northern Ireland: Shell, British Petroleum, Eagle and the three companies' marketing subsidiary, Shell-Mex and B. P., may build a petroleum refinery in Northern Ireland. Actual operation would begin in three or four years.

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Pigments/Brazil: Solitone Laboratories (Teaneck, N.J.) has licensed Schilling-Hillier, SAIC (Rio de Janeiro) to manufacture its textile printing and dyeing colors.

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Fertilizers/Israel: Fertilizers and Chemicals Ltd. (Haifa) plans a $6.7-million expansion program that will double nitrogen facilities and provide capacity for liquid and compound granulated fertilizers. Ammonia output is slated to rise to 20,000 tons/year by '60, eventually will reach 26,000 tons. Incidentally, the firm's sales last year were up 50%, to $11.2 million.

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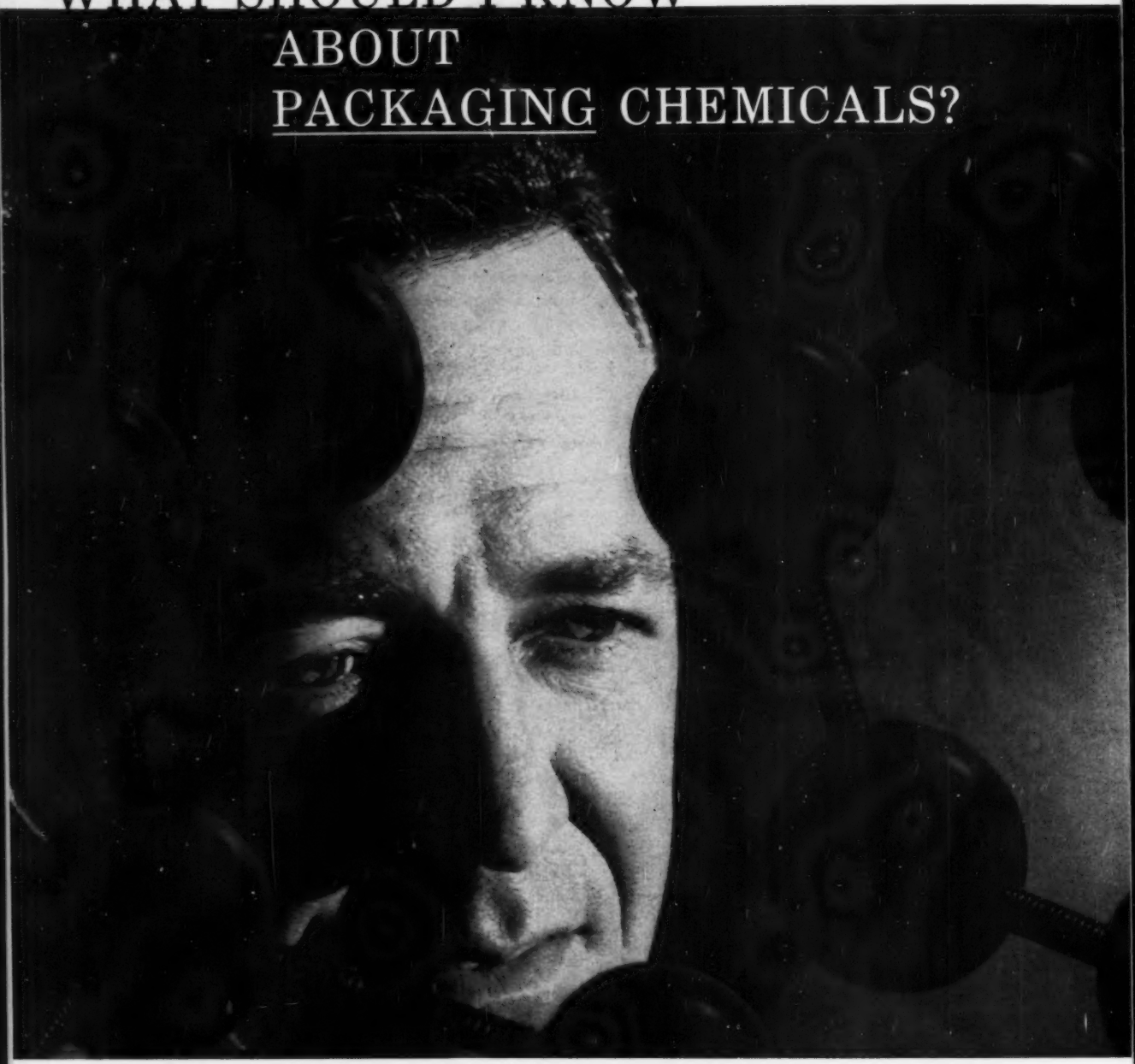

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Washington
Newsletter

CHEMICAL WEEK
April 11, 1959

President Eisenhower may intervene in the price-wage battle if necessary to block a new inflationary spiral. His tough talk in press conferences isn't just talk. His associates say he's ready to act this time, much as he hates the idea of White House interference.

The President has no specific program in mind, but what happens in the steel negotiations will determine his course.

Several courses short of direct controls are possible. He might appoint a fact-finding board, for instance, to explore how high steel wages could go without affecting prices. Or he might call both parties to the White House for informal chats, thereby focusing the publicity spotlight on those responsible.

The President's chief economic advisor, Raymond Saulnier, has already scored a major point. He has obtained permission to raise oil quotas if domestic prices rise out of proportion to increased costs. Similar quota hikes in Japanese textiles have been hinted if domestic prices climb.

Here's the outlook on steel. The companies are thinking in terms of a 9½¢/hour hike, which would be in line with the average annual increase in output per man-hour since World War II. But current productivity per man-hour is climbing faster than that, as it always does when industry pulls out of a recession. If the union tries to match that rate, the companies will balk.

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Industrial wholesale prices are going up 1 to 2% this year, even without a steel hike. That's the solid opinion of Washington's top price analysts. They note the 7% rise in the past year of products sensitive to the market, and see a further strengthening of the market. The increases won't be reflected in the consumer price index until next year, however.

Here's how the Washington experts closest to price trends view the prospect for specific items:

• Chemicals and derivatives—industrial chemicals will be relatively stable; petrochemicals prices are expected to be soft because of the big increase in productive capacity over the last few years. Benzene is uncertain because much of it stems from coke production. Heavy supplies of soybean oil constitute a downward pressure.

• Prepared paint—prices depend on steel because of container costs; paint materials prices are trending slightly down because of greater use of solvents; pharmaceutical prices may drop somewhat as a result of government court action charging price collusion.

• Rubber and rubber products—prices will hold steady on the high side. Tire and tube prices will be practically unchanged as synthetics assume increasing importance.

• Textiles—mixed piece goods are moving up because of better

market tone and higher labor costs. Clothing is holding even, with more use of cheaper blends.

• Hides and leather—may jump 5% by fall. Higher shoe prices are certain, probably 50¢ to $1 on popular-priced shoes.

• Nonmetallic minerals—concrete, structural clay and gypsum are trending down. Glass will probably be an exception because of recent strikes.

• Pulp and paper—a 1 or 2% rise is likely because of greater use of paper products.

•

Look for a ban soon on several more coal-tar colors used in the drug and cosmetic industries, particularly reds used in lipstick and rouge. A delisting is under "active consideration" by the Food & Drug Administration and should be forthcoming in about two weeks. Industry representatives conferred with officials several weeks ago to give whatever evidence they had that the colors are completely safe, as now required by a recent Supreme Court ruling. FDA officials weren't convinced. There have already been two orders delisting Red 32 and a group of yellows.

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More FDA standards in dietary foods may follow an order spelling out which artificial sweeteners may be used in canned dietetic fruits. Next on the list may be vegetables. The order on fruits actually endorses the sweeteners almost universally used now—saccharin, sodium saccharin, calcium cyclamate, sodium cyclamate, or any combination of these. But it requires prominent use of words "artificially sweetened" above the name of the fruit.

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More basic chemical research in solid and liquid propellents and combustion is indicated by the Navy. The Office of Naval Research is establishing a propulsion chemistry branch headed by Ralph Roberts, former research coordinator for chemistry. Roberts replaces an engineer as head of propulsion study. An increase in research funds is sought in the '60 budget.

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FTC relied on scientific evidence, not consumer claims, in deciding the Evis water-conditioner case. FTC has ordered Evis Manufacturing Co. (San Francisco) to stop claiming that its device will make hard water soft, remove unpleasant odors, save soap, reduce the cost of heating water, and leach out alkali and salts in soil. FTC describes the Evis device as "an oversized pipe coupling with an interior cross-post integrally cast in place. It is made of cast iron or bronze or similar metals and coated inside and out with zinc galvanizing."

There are some similarities between this case and the AD-X2 battery additive case, in which the commission finally ruled the product was not falsely advertised. But FTC found some scientific evidence to favor AD-X2; it finds none to support the Evis claims.

Progress Report...

— 1-Pentanol
— CELLOSOLVE acetate
— Emulsified buffing compounds

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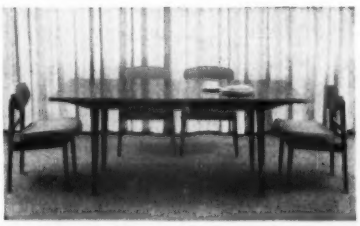
Resins produced from monomeric straight-chain derivatives of 1-pentanol are reportedly more crystalline than those made from isomeric derivatives. This has advantages in acrylates, methacrylates, silicones, and polyesters. Metal salts, phosphorous compounds, and other inorganic derivatives used as catalysts, additives, or inhibitors for fuels, oils, paints, and other materials may also gain advantages from these special amyl alcohols. 1-pentanol is also suggested for trial as an intermediate in the production of coupling agents for lubricants, alkyl nitrates as ignition promoters, ester plasticizers, and polyvalent metal amylates as epoxide curing agents.

For a technical bulletin listing properties, analyses, and suggested uses, check the coupon on this page.

Solvent saves time in furniture finishing

One of the most versatile of CARBIDE's lacquer solvents is CELLOSOLVE acetate. Because of its exceptional flow-out properties, it is widely used in formulating furniture and metal lacquers.

Lacquers containing CELLOSOLVE acetate require only minimal sanding or rubbing, helping to lower production costs.



Slow evaporation rate and improved flow-out ability make CELLOSOLVE acetate ideal for brushing lacquers, too. It provides good blush resistance and high gloss, whether used for conventional spraying, hot-spray finishing, "high-low" finishing, or brushing.

Further information on CARBIDE's esters is contained in the booklet, "Esters." Suggested applications include those for plastics, dyes, perfumes, and pharmaceuticals. Check the coupon for your copy.

Emulsified buffing compounds

Emulsion buffing compounds have several advantages over bar-type compounds for metal finishing. With CARBIDE's triethanolamine as the soap-forming emulsifier, compounds are quickly made ready for use and provide good flow properties. They are stable, less viscous on agitation, and hold the abrasive suspended even while stored. The emulsion is easily removed by rinsing.

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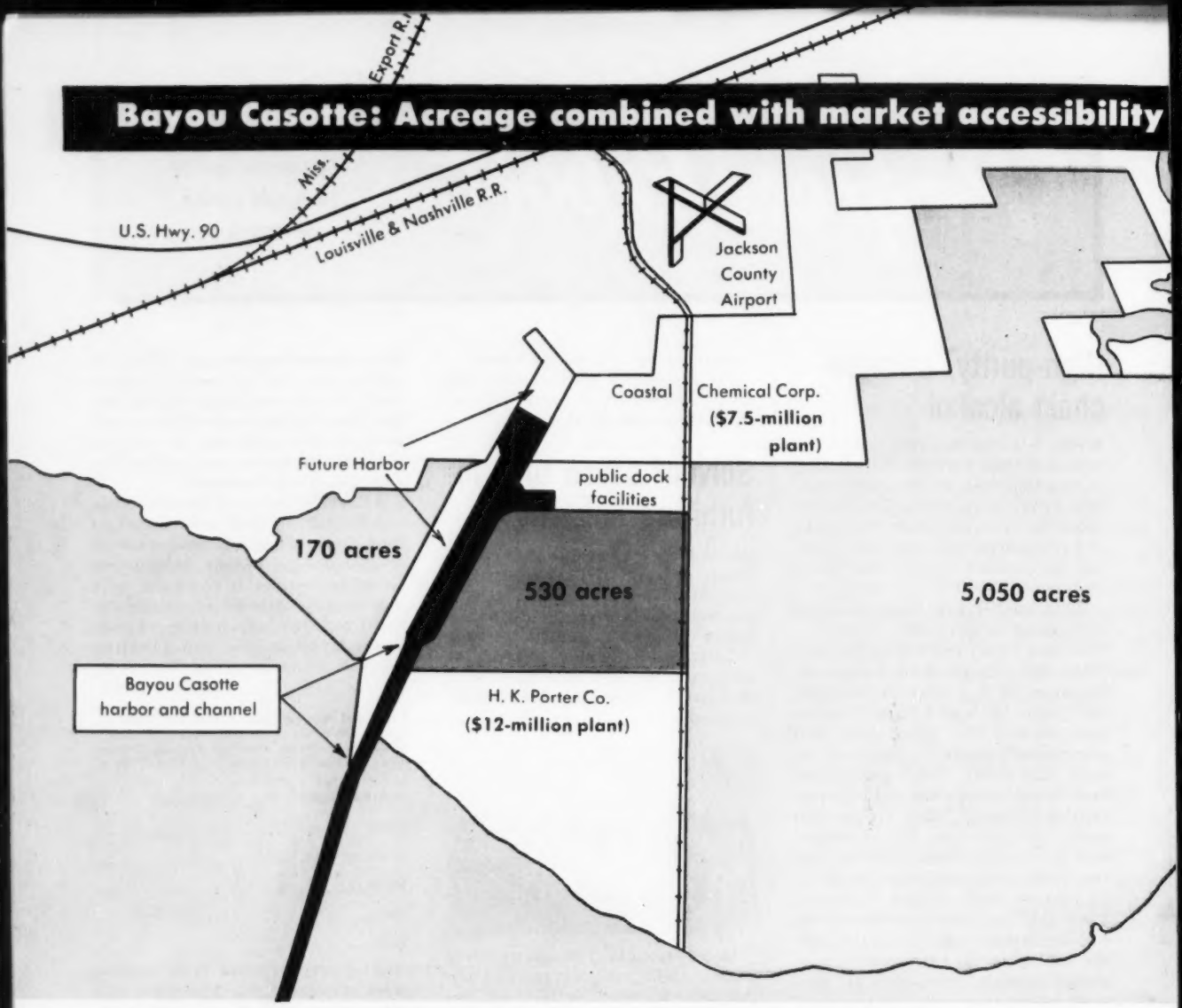


Mississippi's Bayou Casotte industrial area seeks to attract industry with its deep-channel port and

Bayou Town Bids for Chemical

This week in historic Pascagoula, Miss., two sets of attache-case-carrying businessmen strolled past the city's picturesque reminders of earlier years, headed for a date with the practical present. They were on their way to discuss final terms of contracts that would bring two new plants to a promising new industrial location—the nearby Bayou Casotte industrial area on Mississippi's Gulf Coast (*see map*).

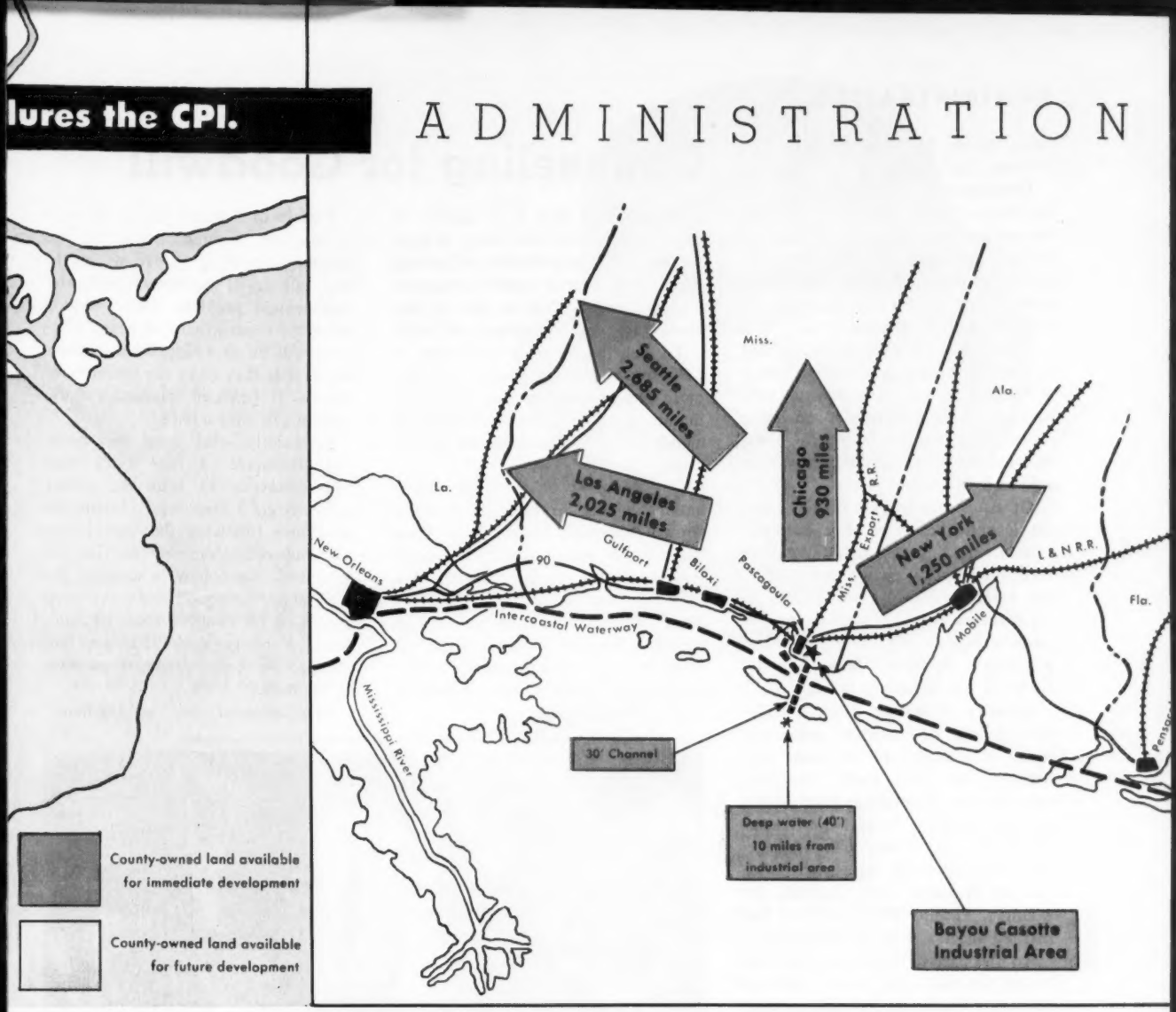
They had come to talk with Al Johnson, who, as chief of the Jackson County Port Authority, spearheads the development of the industrial area. Their negotiations may well set a pattern for chemical process companies that are now actively seeking a Gulf Coast plant site.

Principal bait offered industry so far: Bayou Casotte's proximity to key raw materials and markets (*see map*), primary considerations for CPI management casting about for a new site. Another plus value: the state's tax program.

Port Authority officials plugging the industrial area are quick to point out that the 7,200-acre Bayou Casotte development is within 1,000 miles of 59% of the total U.S. retail purchasing power, is conveniently located for exporting to key Latin-American and world markets. They also boast of 10 railroads serving the state with over 4,000 miles of track; 6,000 miles of paved highways; two major airlines serving 13 state cities; and the nearness of the Intercoastal Waterway. (A 30-ft. channel extends from Bayou Casotte into Mississippi Sound, connects with the Pascagoula Channel three miles south of the mainland. Two miles farther south, the channel joins the waterway.)

As for raw materials, Bayou Casotte promoters hand out an imposing list indicating that Mississippi abounds

lures the CPI.



its Gulf Coast location convenient to key U.S. industrial centers and major Latin American markets.

Industry's Plant Site Seekers

in 13 of the 34 raw materials most frequently used by the chemical process industries, including: water—52 in./year average rainfall, large rivers and a ground supply that's capable of providing 5 million gal./day; lignite coal; salt—48 salt domes lie in a belt across the southern portion of the state; limestone; petroleum—Mississippi is the 10th ranking oil-producing state; natural gas—reserves are estimated at 2.4 trillion cubic ft., 59 pipelines cross the state, a 12-in. line is under construction to Bayou Casotte; gypsum; sand—10,000 tons/day of sand and gravel; bauxite; iron ores.

Two Chemical Firms In: So far two chemical firms have located in the Bayou Casotte area, Coastal Chemical Corp., with a $7.5-million chemical fertilizer plant, and H. K. Porter, with a $12-million refractory products plant (*see map*). Firms locating in the area have a choice of 530 acres ready for immediate development, 5,220 acres available for future development. Land sells for $200 to $1,000/acre.

In the nearby Pascagoula-Moss Point industrial area to the north and west are a number of chemical process and related industries, including Thiokol Chemical Corp., Vitamins Inc., International Paper (one of the state's largest plants, with 1,700 employees and a $6-million annual payroll), and Pascagoula Veneer Co.

Industrialization of Mississippi is only 10-15 years old; and manpower, skilled and unskilled, is plentiful. Today, 4.6% of the state's 2.2 million people ('50 census) are employed in manufacturing. In Jackson County, 41.1% of workers are classified as skilled; 23.5%, unskilled; 8.4%, professional; 13.6%, "white collar"; 13.4%, business employees. Mississippi has a "right-to-work" law, which bans union shops; wages

range from $1/hour minimum to $3/hour for highly skilled workers.

Development and promotion of the Bayou Casotte industrial area and the various inducements offered industry in Mississippi are all part of the state's ambitious Balance Agriculture with Industry (BAWI) program to promote industrialization.

Under the program—well grounded in a series of state laws—cities, towns and counties are permitted to vote bonds for the purpose of financing industrial sites and buildings for desirable industries. Those holdings can be sold or leased to industry.

Of equal importance is the state's tax incentive program. For example, county and municipal ad valorem taxes on property owned and used by the manufacturer in the conduct of his business may be waived for five years, except on inventory of finished products. Property leased under BAWI is not subject to taxation.

Industry Reaction: With the increasing use of industrial areas and parks as a means of attracting new industry for the South, observers naturally are questioning the success of such ventures. From New Orleans westward into Texas, CPI management has taken to industrial parks. On the Houston Ship Channel, for example, Phillips Petroleum has had marked success with its development.

To the east of Bayou Casotte, the record for industrial parks is less encouraging. Alabama has no industrial parks in the true sense of the word. Georgia has some extensively developed parks and South Carolina has a few, but neither state has a bona fide chemical manufacturer located in an industrial park.

Naturally not all CPI plants are suited for industrial areas or parks, since chemical site selection depends on so many factors. But industrialists in the South point to a need for chemical plants that would produce to sell to other chemical plants. They report a demand for such products as alcohol, carbon black, cotton seed oil, tung oil and naval stores. And, there's a shortage of soapmakers in the South, an area that has a large demand for soap. Mississippians feel that raw-material resources—particularly natural gas—in their state are so suitable that CPI management interested in a new plant site would do well to evaluate Bayou Casotte.

Counseling for Goodwill

Management men in a number of large corporations have come to realize that it's more profitable in the long run to help keep a smaller customer-firm in business than to drive it into bankruptcy for nonpayment of bills.

To help their small customers, a *CW* spot-check last week revealed, more and more larger firms are spending an increasing amount of time and money giving free management and financial advice.

One company that's doing this—and is willing to talk about it—is Crown-Zellerbach Corp., large West Coast paper manufacturer. The company's general credit manager, William Keplinger, encourages the firm's small business customers to send in monthly financial statements for review by the paper concern's credit department. Weaknesses are spotted, advice is offered.

Variety of Advice: Nor is counseling restricted to financial matters. One company reported, "We're willing to help our small customers with any management problem. Often less-experienced management of newer concerns will be so wrapped up in daily details that they can't see the broader picture. It helps if someone on the outside can offer advice."

Frequently, small firms need financial assistance. Larger firms may even intercede to help the debtor company get a bank loan. Usually the procedure following the loan is for the counseling company to visit the borrower, assist him in putting the new money to sound use. "We keep an eye on his monthly financial statement," Keplinger said. "If he gets into trouble, we know about it as soon as he does."

By-product of the "helping-hand"

Model City for Nuclear Miners

Construction of this proposed Grand Valley, Colo., industrial city could be under way by the early '60s, if Operation Plowshare—an upcoming government attempt to extract shale oil through an underground nuclear blast—proves economical. The city, initiated at the request of Colorado's Gov. Steve McNichols and planned by Cornell University architectural students, would extend 30 miles along the Colorado River valley, accommodate 350,000 residents. It would feature a monorail transportation system to speed workers from residential areas to shale mining sites located in remote canyons extending at right angles to the Colorado River.

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ADMINISTRATION

business relationship: debtor businessmen are inclined to look more favorably on the big creditor corporations. It's another means of developing an acceptable corporate image during a period when anti-big-business feeling is on the rise.

LABOR

Union Leadership Training: There was another strong indication last week that officials of the AFL-CIO chemical unions — International Chemical Workers Union and Oil, Chemical & Atomic Workers Union— expect completion of their merger negotiations at simultaneous conventions in October. Latest merger indication: scheduling of training schools, arranged jointly by the research and development departments of both unions.

The schools will be held June through August at various locations. During each week-long school, union leaders will attend workshops on a variety of subjects, including collective bargaining and political action.

•

Atomic Worker Safety Standards: It appears that some kind of federal standards for safety of workers exposed to atomic radiation will result from hearings by the Congressional Joint Committee on Atomic Energy. Most witnesses agreed with Oil, Chemical & Atomic Workers Union Vice-President Elwood Swisher that standards are needed. But there's wide disagreement among witnesses and committeemen over whether federal or state governments should enforce them.

Union spokesmen, observers report, still haven't convinced the majority of the committee that a federal workmen's compensation program, backed by federal safety enforcement, is a long-run necessity. The question will come again next month, when the committee delves into federal-state relations in the nuclear field.

•

Diamond Crystal Contract: Approval by members of Local 207, International Chemical Workers Union, of a two-year contract has ended an 88-day strike at Diamond Crystal Salt Co.'s Akron, O., plant. The pact provides for an increase of 11.3¢/hour in combined wages and fringe benefits retroactive to Dec. 1, '58. It also

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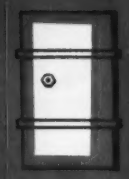

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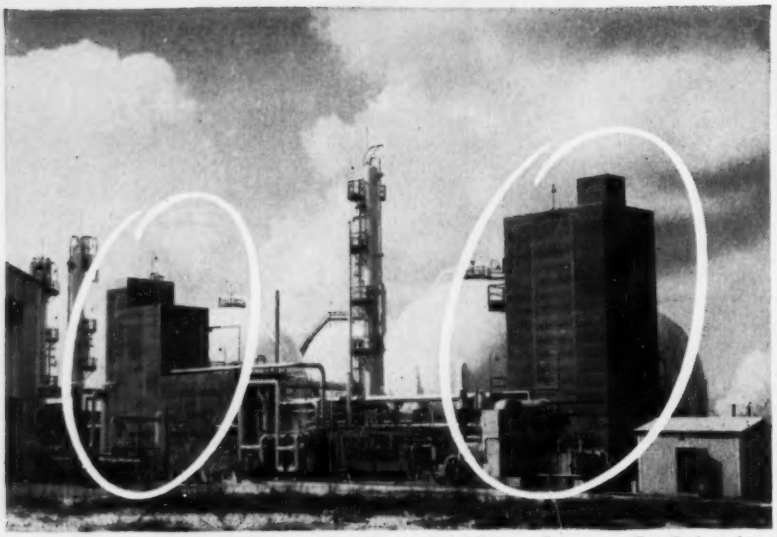

Part of the Petroleum Chemicals Inc. installation at Lake Charles, La., showing the two Air Liquide units mentioned below. Roy Trahan photo

Low-temperature separation at its best!

The large and complex project of Petroleum Chemicals Inc. and Calcasieu Chemical Inc., at Lake Charles, La., is typical of the wide scope and adaptability of low-temperature gas separation.

At the P.C. ammonia producing plant, a raw hydrogen feed stream containing platformer, butadiene, hydroformer and ethylene cracking off gases, is treated by an Air Liquide low-temperature nitrogen scrubbing unit. It is the largest of its kind to handle such a variety of feed streams.

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The Calcasieu Chemical plant, with an Air Liquide 180-ton-per-day oxygen unit, uses the gas directly to manufacture ethylene oxide. This unit, differing from the conventional design, is a low-pressure regenerator type producing at the required pressure of 225 psig using liquid oxygen pumps. This special Air Liquide cycle eliminates the problems of oxygen compressors and results in a safe plant with lower power consumption and good process control.

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ADMINISTRATION

calls for a 7¢/hour wage increase this year, 10¢ more for each Sunday hour worked, a meal allowance boost from $1 to $1.25, four weeks' vacation for employees with 25 years' service and three weeks for those with 13 years. Dec. 24 becomes a seventh paid holiday. There is a wage reopener Dec. 1.

LEGAL

Trademark Suit: Lever Bros. Co. (New York) in a suit filed in U.S. district court (Cleveland) has charged Merle Moritz, trading as William Roberts Oil Products Co. and William Roberts Oil Products, Inc., and William Magid, agent (all of Cleveland), with trademark infringement and unfair competition. The complaint charges that the defendant manufactured and sold a detergent product to which he applied the Lever Bros. trademark "all." Lever asked an accounting of profits, treble damages and a restraining order.

•

Battery Additive Suit: Magnaflow Co., Inc. (Youngstown, O.), battery additive maker, has filed a $250,000 damage suit in Akron against the Akron Better Business Bureau, charging that the bureau damaged the firm's reputation by saying its product was "of no value" and that it was being "falsely advertised."

KEY CHANGES

Donald J. Collins to vice-president for marketing, **Richard I. Goodkind** to vice-president for administration, Tennessee Products & Chemical Corp. (Nashville), subsidiary of Merritt-Chapman & Scott Corp.

H. E. Robinson to vice-president in charge of scientific research, Swift & Co. (Chicago).

J. W. Dunlap, Henry W. Meers, to directors, International Minerals & Chemical Corp. (Skokie, Ill.).

J. Peter Grace, Clifton W. Phalen, R. Stuart Keefer, to directors, Kennecott Copper Corp. (New York).

Leon A. Patt, William H. Wendel, Clarence D. Shepard, to directors, Carborundum Co. (Niagara Falls, N.Y.).

J. H. Saunders to director of research, Mobay Chemical Co. (Pittsburgh).

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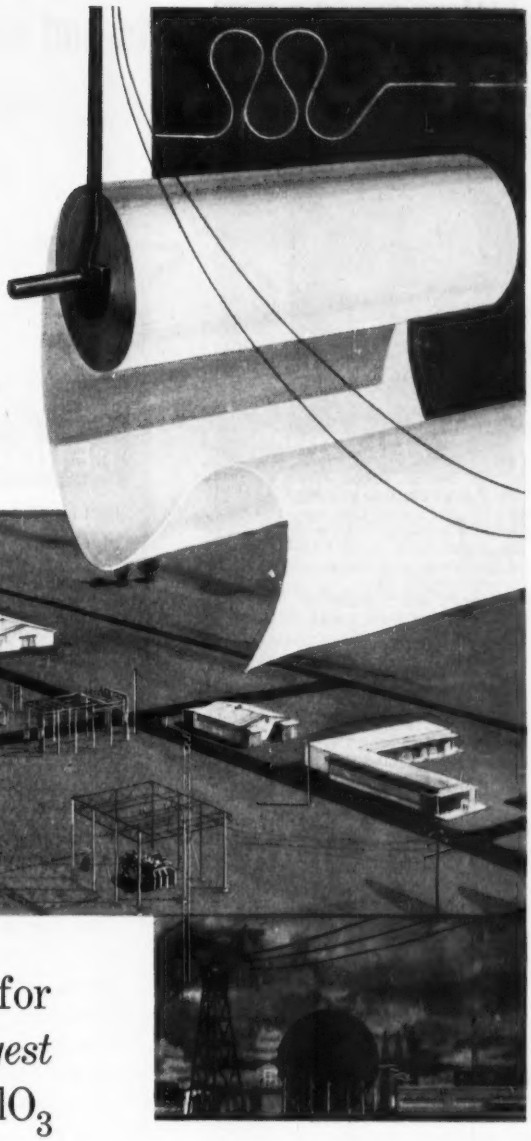

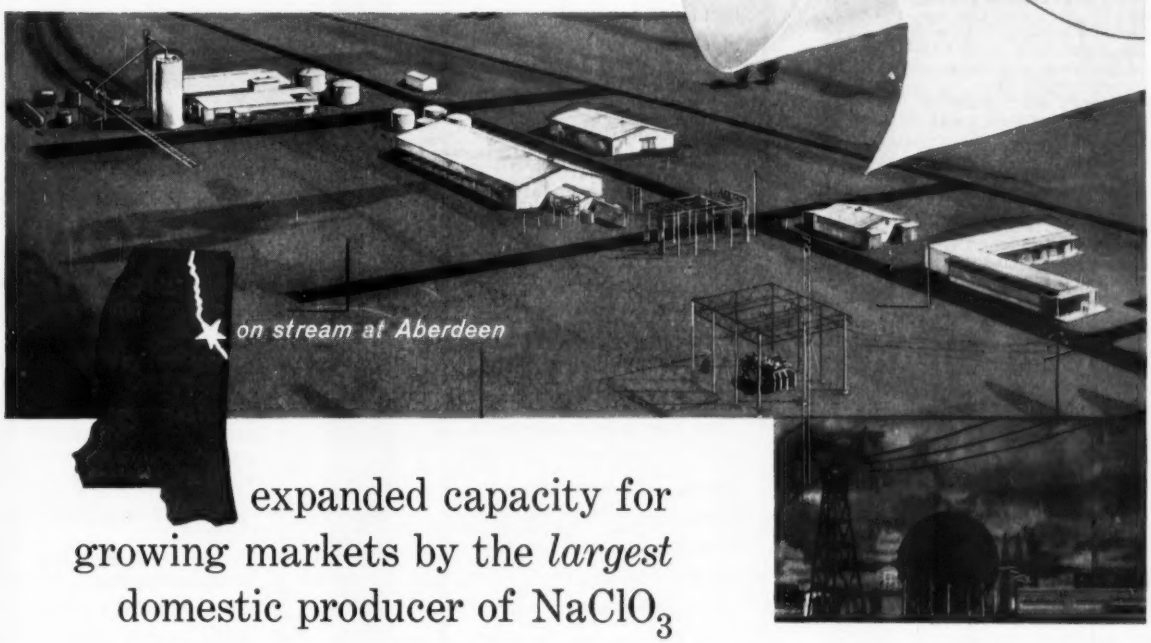

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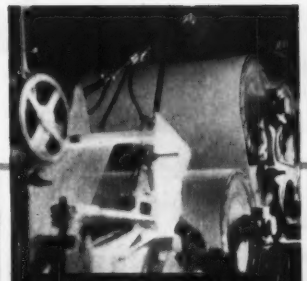

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The verdict is unanimous—Pfizer Gluconic Acid and Sodium Gluconate assure you of compounds with the highest cleaning and etching efficiency. Write Pfizer for complete technical data and information on the proper Gluconate use levels.

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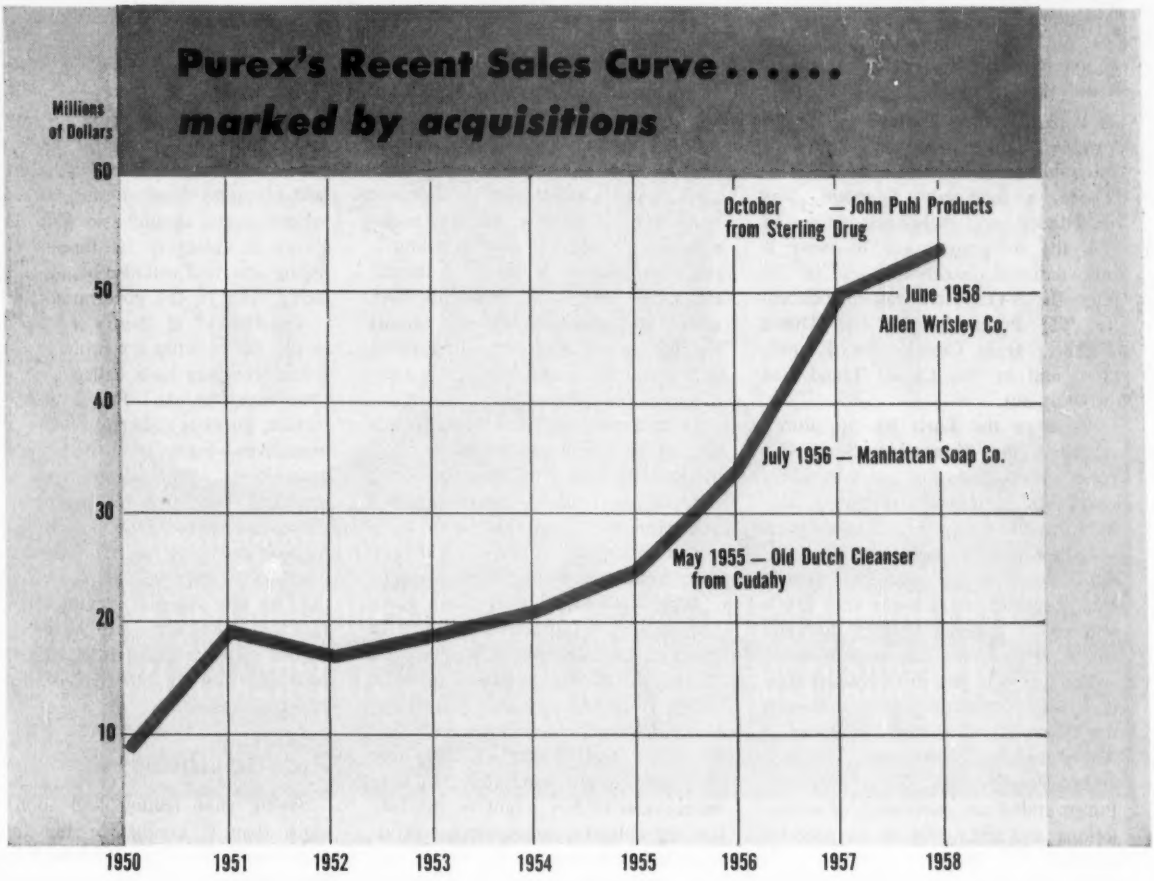


Acquisitions Put Purex in National Picture

Stockholders of Purex Corp. Ltd. (South Gate, Calif.) last week approved an increase of 100% in the company's authorized common stock. Reason: to provide a capital structure adequate for any expansion opportunity that might arise. Based on the record of the last few years, it shouldn't take long for Purex to put any newly acquired funds to work.

Since '55, the company has acquired Old Dutch Cleanser from Cudahy Packing Co. (May '55) and annexed three companies, Manhattan Soap Co. (July '56), Allen B. Wrisley Co. (June '58) and John Puhl Products (Oct. '58). Sales went from $25 million in '55 to $54 million.

Purex is now the fourth-largest manufacturer of household cleaning products (behind soap's "Big Three" —Procter & Gamble, Lever Bros., Colgate). It is second in the sales of liquid bleach, dry bluing and dry, light-duty detergents; first in sales of heavy-duty dry bleach; fourth in liquid light-duty detergents and household cleaners; fifth in nondeodorant bar soap.

These "firsts" and "seconds" should not destroy the perspective of Purex's position. Colgate, the No. 3 producer of household products, has sales 10 times those of Purex. But that distance doesn't seem so great viewed from one point: Purex has been in existence only about 30 years. And for almost 25 of those years the company has been practically a one-product outfit, depending almost entirely for its income on regional sales of Purex liquid bleach.

Today, the company has six nationally distributed products: Dutch Cleanser, Trend (liquid and dry detergents), Beads-O'Bleach, Blu-White Bluing, and Sweetheart Toilet Soap. Its Little Bo-Peep household ammonia is not yet in national distribution. These are turned out at 19 plant locations in the U.S. and Canada, and there are four foreign manufacturing or packaging operations. The company also has 82 warehouse facilities and 18 sales offices. There are some 2,000 employees.

Three Ps and a Pot: Like many specialty outfits, Purex began life in a garage. Three men, Lionel and Ray Precourst and Adrien Pelletier, started the company in '25 in Los Angeles with a working capital of little more than $125.

The company moved to nearby South Gate 12 years later and introduced a number of new products, including a drain opener, a bowl cleaner and some commercial bleaches. The bulk of the income,

however, came from sale of its first product, liquid bleach.

Common stock was not offered to the public until '46 (sales were then about $8 million annually) and that point marked the beginning of Purex's change from basically a single-product house into an aggressive competitor in its field. In '48, Dry Trend, a light-duty detergent, was introduced and sold regionally. In '53, the company began to move it into national distribution, and in '54, Dry Beads-O'Bleach was introduced. In '55, Purex bought Old Dutch Cleanser from Cudahy for $2 million; and in '56, Liquid Trend was brought out.

Turn to the East: In '56, Purex acquired the Manhattan Soap Co. (plus a sizable tax-loss carry-forward) and with it Sweetheart Soap, Blu-White Flakes and Protex deodorant soap. Along with the Manhattan products, Purex got a plant in Bristol, Pa., from which it could ship products to its growing Eastern markets. In '58, Purex obtained a ready-made selling force in the drug, variety and department store field when it bought the Allen B. Wrisley Co. (Chicago). Along with a line of men's (Spruce) and women's (Blue Fern) toiletries, Purex added an assortment of soaps, lotions and shampoos to its product roster.

To give itself a centrally located plant for the manufacture of liquid bleaches and other items and to add another line (household ammonia) to its growing list of household cleaning products, Purex bought the John Puhl Products Co. (Chicago) from Sterling Drug. The addition of Puhl's bleach sales to its own increased by nearly one-third Purex's share of the total national liquid bleach market and gave it new distribution outlets in North Carolina, Virginia, West Virginia, Ohio and Michigan as well as Washington, D.C.

The Purex Formula: What has prompted Purex's surge of acquisition? Craig Davidson, vice-president in charge of its advertising, told *CW* that the growth of Purex "reflects the impact of modern marketing methods and the use of mass-communication media on the operating patterns of an industry." Today, he maintains, only the large company can market efficiently. The owners of small companies making soaps, detergents or proprietary cleaning products can make a living by local sales—but have to operate on a small margin to offer a price advantage.

"Small companies," says Davidson, "or companies with a limited line of products, can't stand the cost of selling against national brands. They can't afford a sales force to compete—it costs just about as much to make a sales call whether you're selling a single product or a dozen of them." He adds, "The small company can't afford to advertise; it's up against big companies that buy advertising in big chunks, which brings the relative cost 'way down."

In research and development, according to Davidson, the small company also has trouble competing. First, it can't afford the extensive—and expensive—facilities. Then, if it makes a valuable discovery, it may have trouble exploiting it properly.

Why Buy? Asked what things make a company an attractive prospect to Purex, Davidson told *CW* that one of the things Purex looks for is a widely respected and accepted name. Dutch Cleanser, Sweetheart Soap and Blu-White, and Wrisley's Holiday line of toiletries are examples. Another inducement to buy might be the fact that the company manufactures products that complement the Purex line and/or distributes in areas Purex does not cover. Facilities are usually a minor consideration in the decision to buy.

About the future, Davidson wouldn't reveal any specific plans. He says: "Purex is looking at everything in the household field, right now is checking through about 50 possible products in the hope of finding one good one." As for more acquisitions in the immediate future, he says, "We're not talking about any future buys right now—but we're always in the market if something looks good enough."

Prognosis for Purex: With these objectives, the company may be able to pick up some good buys among the smaller outfits in the soap field. It has two things favoring it: first, the inability of the smaller company to compete effectively in today's market; second, the wary eye the anti-trust-minded government agencies have fixed on any acquisitions by its "Big Three" competitors.

The recent addition of a line of toiletries should give greater scope to the Purex marketing effort than does its soap sales, since the latter field isn't growing much (except due to population rise); any growth there is usually a case of grabbing part of the competitor's piece of pie. Expanded distribution outlets and a stronger sales team in the drug and variety stores should also help. And Purex is enlarging its foreign marketing arm, and will also begin emphasizing sales to the government.

Top-Heavy? If there's a weakness in the Purex setup it's probably what some observers have called a case of "too many chiefs." For a company its size, Purex is rather top-heavy with executives—many taken on with new acquisitions. With each new vice-president exercising his prerogatives, the company could be slowed in exploiting changing market conditions. Much of Purex's past success has been due to this internal flexibility. The fact that it might have to worry about such a problem at all is proof that it really has moved into the "big time" in its field.

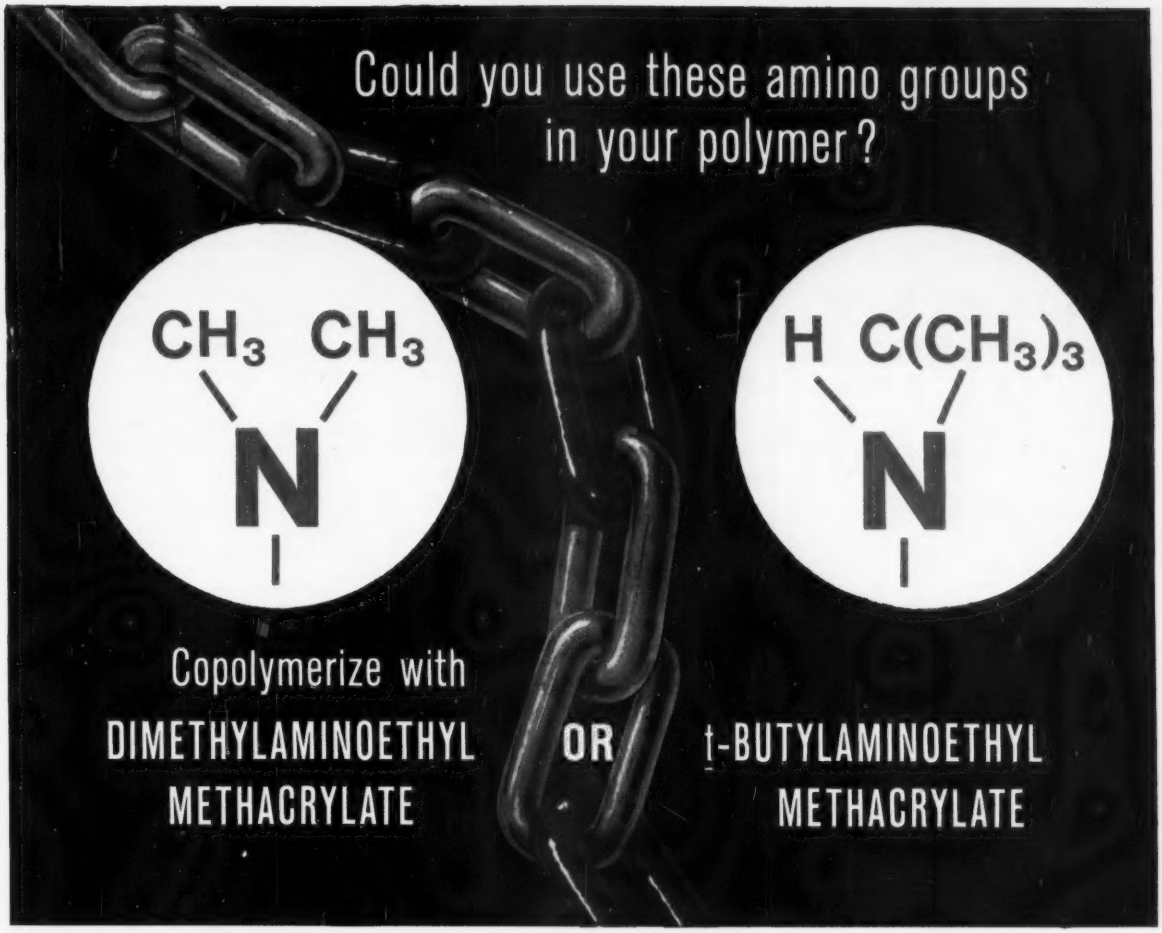
Plastic Shoes

Saving shoe leather will soon be more than a saying for the Intercontinental Shoe Corp. (New York). The company will begin marketing a line of injection-molded, polyvinyl chloride shoes late this month. The plastic shoes, designed for girls in the 8-12-year-old group, will retail in the $2-4 range. The shoes will be marketed under the tradename Orbits and initial distribution will be made through chain and department stores. Sales outlook in '59: 2 million pairs. Each pair uses 0.6 lbs. of resin; current supplier is Union Carbide.

Sound Cleaning Closer

Ultrasonic dishwashing is a little closer to commercial realization. Latest company to come up with a prototype dishwasher is Narda Ultrasonic Corp. (Westbury, L.I.). Narda showed its conception of an ultrasonic cleaner at the recent Institute of Radio Engineers show in New York.

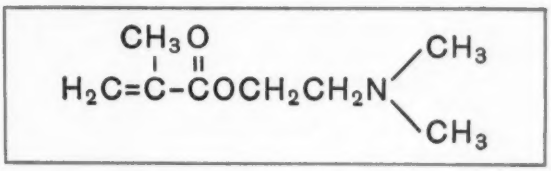
Narda's dishwasher is not quite ready for the market, according to company officials, but the working

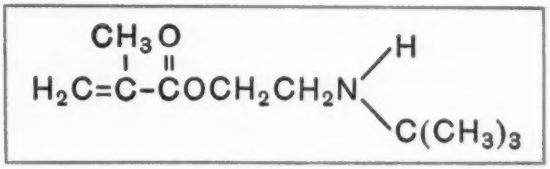


Do you need a copolymer with basic properties?—Copolymerization of Dimethylaminoethyl Methacrylate or *t*-Butylaminoethyl Methacrylate with monomers such as acrylonitrile, butadiene, acrylic or methacrylic esters, styrene, or vinyl acetate could solve your problem.

Vinyl polymerization and addition to the double bond are reactions common to both monomers. Dimethylaminoethyl Methacrylate is very soluble in water; it can be polymerized to a water-soluble cationic polymer, or copolymerized with acidic monomers such as methacrylic acid to give amphoteric polyelectrolytes. Copolymers of *t*-Butylaminoethyl Methacrylate exhibit good color characteristics. Individual reactions include: Dimethylaminoethyl Methacrylate—salt formation and quaternization; *t*-Butylaminoethyl Methacrylate—typical reactions of the amine group via the active hydrogen. Both monomers are soluble in all common organic solvents.

These monomers are suggested as intermediates for producing anchoring agents for dyes, pigments, waxes, oils, and moistureproofing compounds to various substrates . . . dispersing agents for nonaqueous systems . . . antistatic agents . . . stabilizers for chlorinated polymers . . . ion exchange resins . . . emulsifying agents . . . and cationic precipitating agents. Both monomers are available in development quantities. Samples and technical data can be secured by writing to Dept. SP-5.





Chemicals for Industry

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In order to provide liquid sulphur conveniently to industrial users of the Tampa area, DeBardeleben Marine Corporation will transport, in a specially-designed ship, liquid sulphur from the Texas Gulf Sulphur Company's loading terminal at Beaumont, Texas, by sea to Tampa, Florida. DeBardeleben's initial storage facilities at Tampa will provide for 12,000 tons of liquid sulphur, with existing storage facilities caring for 50,000 tons of solid sulphur. This will be available for distribution to users, in any quantity, via tank cars and trucks. The sea-going sulphur vessel will also carry ammonium sulphate, potash, salt cake, ore, phosphate rock, superphosphate, triple superphosphate and other dry, bulk commodities between Gulf ports. This will be the first liquid sulphur terminal in the Florida area.

model that was displayed at the IRE show is expected to be in production later this year. Known as the Vanguard, the Narda model is a mobile, roll-around unit, which can be plugged into any 110-volt electric outlet and hooked up to the normal household plumbing system. It's designed to operate with normal dish-washing detergents and tap water.

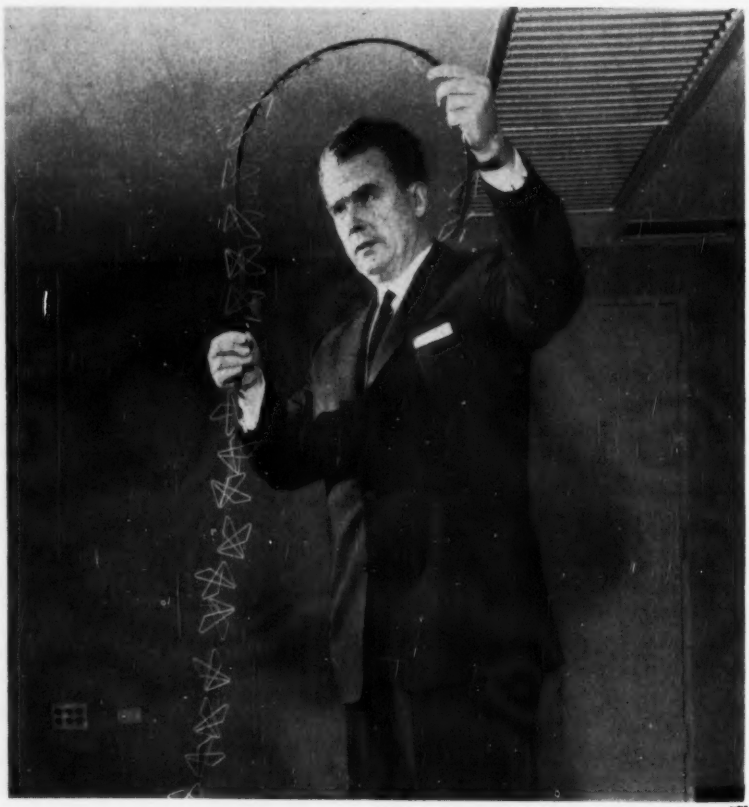
Pressure Buildup

Forecasting a big '59 for the aerosol industry, American Can Co.'s market experts pinpoint paints as a major growth group. Canco estimates "the biggest year ever in the aerosol industry," with production of about 555 million pressure cans. This tops '58 output of 483 million units by 15%.

Push-button paints, according to Canco's calculations, should enjoy a 20% increase in sales in '59, hit 60 million, an increase of 10 million over '58, 25 million higher than '57. A sizable share of the increase in pressure paints is expected to come from sales of reflective colors.

There's a good likelihood that '59 will see the introduction of a larger size of paint container to supplement 6-, 12- and 16-oz. cans now used.

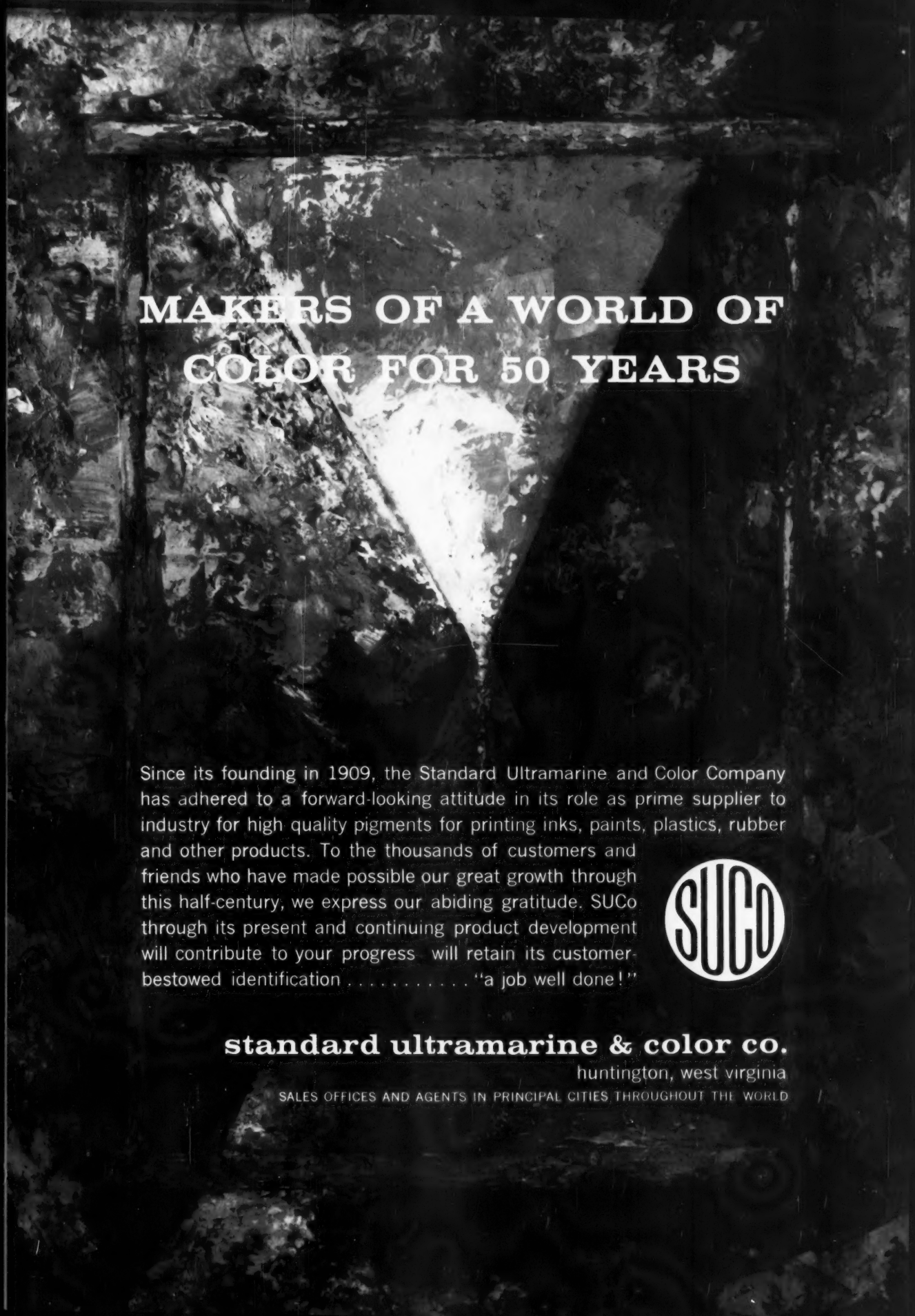
Of the 555 million units forecast for '59, Canco thinks 95-100 million will be food items, a sizable increase over '58's output of 85 million.



UPI

New Twists in Magnetism

This flexible magnetic Koroseal plastic developed by B.F. Goodrich holds paper clips to show its clinging-vine properties. The material contains barium ferrite (for magnetic properties) and plasticized polyvinyl chloride. Westinghouse is using it for refrigerator door seals. The plastic can be either spot- or shape-magnetized; permanency of the magnetic attraction is said to be twice that of many conventional rigid magnets. Goodrich's Industrial Products Division (Marietta, O.) turns it out.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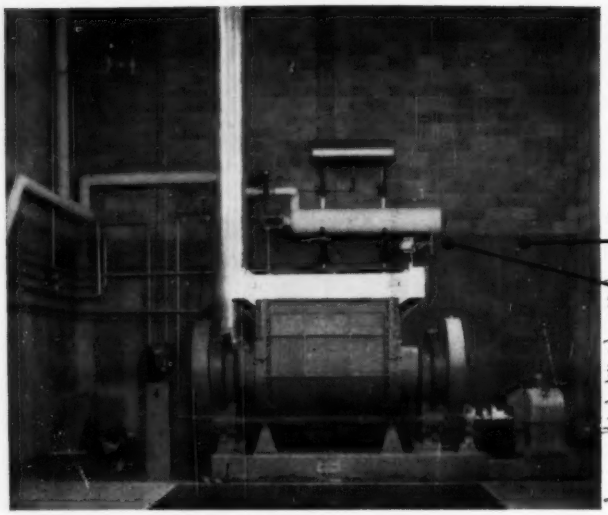
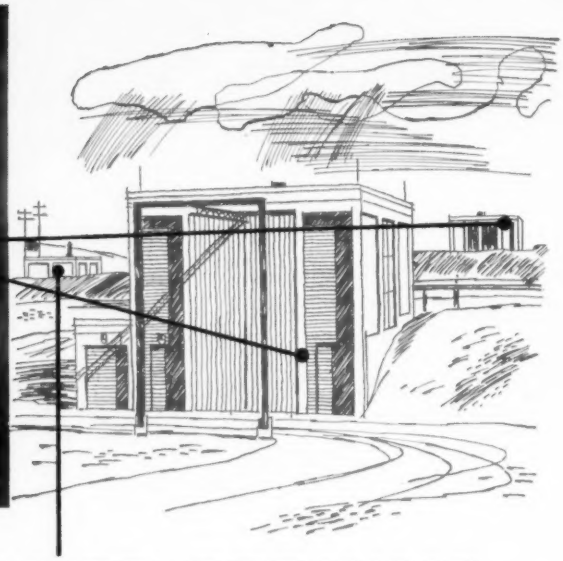
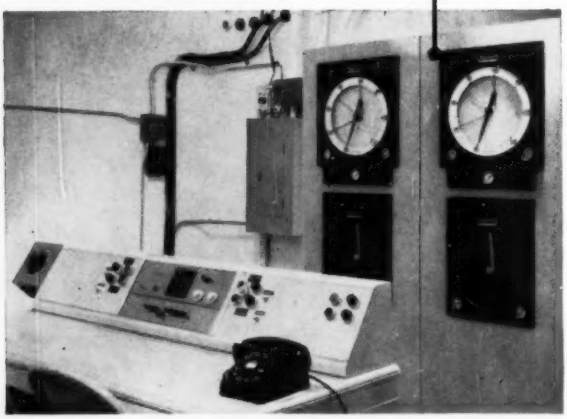




TWO MORE BAKER PERKINS MIXERS ON THE JOB at new Thiokol® solid propellant plant in Utah

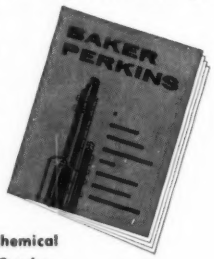


Inorganic oxidizers, the chemicals which make solid rocket propellants burn with such intensity, are first ground to a particle size . . . blended thoroughly . . . then mixed with an elastomeric binder. Fundamentally, that's how Thiokol Chemical Corporation makes a fuel for a rocket motor. The mixing of high energy fuels is a delicate, exacting operation and the mixers must be highly efficient and absolutely dependable.

At the Brigham City, Utah plant, Thiokol has recently installed two more Size 18 JWRM-2 Baker Perkins mixers. Each of these mixers is constructed of stainless steel and has a 300 gallon working capacity. The units, housed in specially constructed buildings, are remote controlled from another building.

Because they are safe *and* efficient, more and more B-P mixers are being used by the rapidly expanding propellant industry. These same high standards of quality are also incorporated into the standard design mixers built for the chemical process industry.

Whatever your requirements may be, Baker Perkins builds mixing machinery to handle every job. Why not write today for Bulletin No. CE-58 containing information on B-P equipment for the chemical process industries.



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365

SPECIALTIES

Primer over Rust

Glidden has a new paint primer vehicle that is "as revolutionary to the painting of steel as latex paints were to interior wall painting." It's called Rustmaster Penetrating Liquid, is described as having exceptional ability to penetrate rust on metal surfaces. The vehicle's molecular structure is intended to enable it to penetrate into the pores of the base metal and set up a tightly bound film that, according to a company spokesman, is "both on and in the surface." It can be used with all primer pigmentations. Glidden says the vehicle gives good pigment penetration, increases adhesion, blister resistance and film flexibility on clean steel as well as on rusted surfaces.

PRODUCTS

New Pitch for Moly: A new fertilizer additive, designed for treating perennial crops with the element molybdenum, has been developed by Climax Molybdenum Co., a division of American Metal Climax (New York).

The material, tradenamed Moly-Gro, will be marketed primarily to commercial fertilizer producers for blending with their products. The additive contains 42% active molybdenum and is available in 50- and 100-lb. drums. Climax will market the product directly along with its recently introduced Moly-Gro seed treatment formulation.

•

Yellowest Green: General Aniline & Film (New York) describes its new pigment as the "yellowest green pigment available." It's called Heliogen Viridine Y, is available in toners, lakes, dispersed powders, water dispersions, pastes and presscakes.

•

Slimming Line: A new dosage form of the anti-obesity agent Preludin (phenmetrazine hydrochloride) has been developed by Geigy Pharmaceuticals. The new "day-long" dosage form, called Preludin Endurets, contains 75 mg. of active principle, compared with 25 in the regular tablet.

•

Spot-Checker: For metal fabricators, Enthone Inc. (New Haven, Conn.) has introduced a liquid additive for hot-water rinses, claims it

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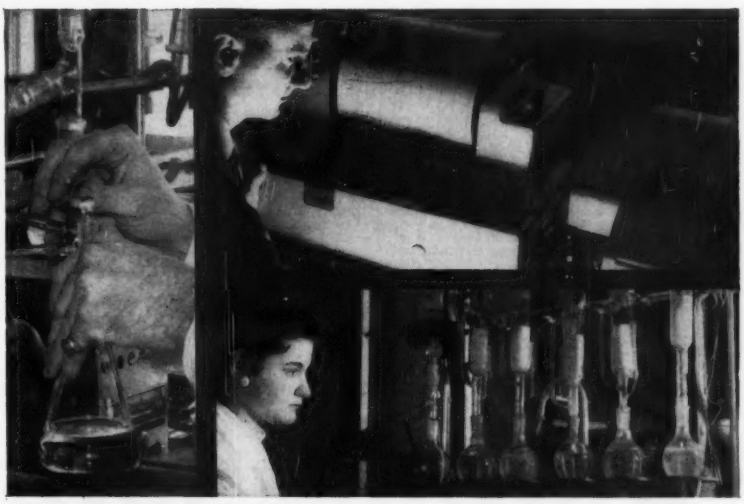

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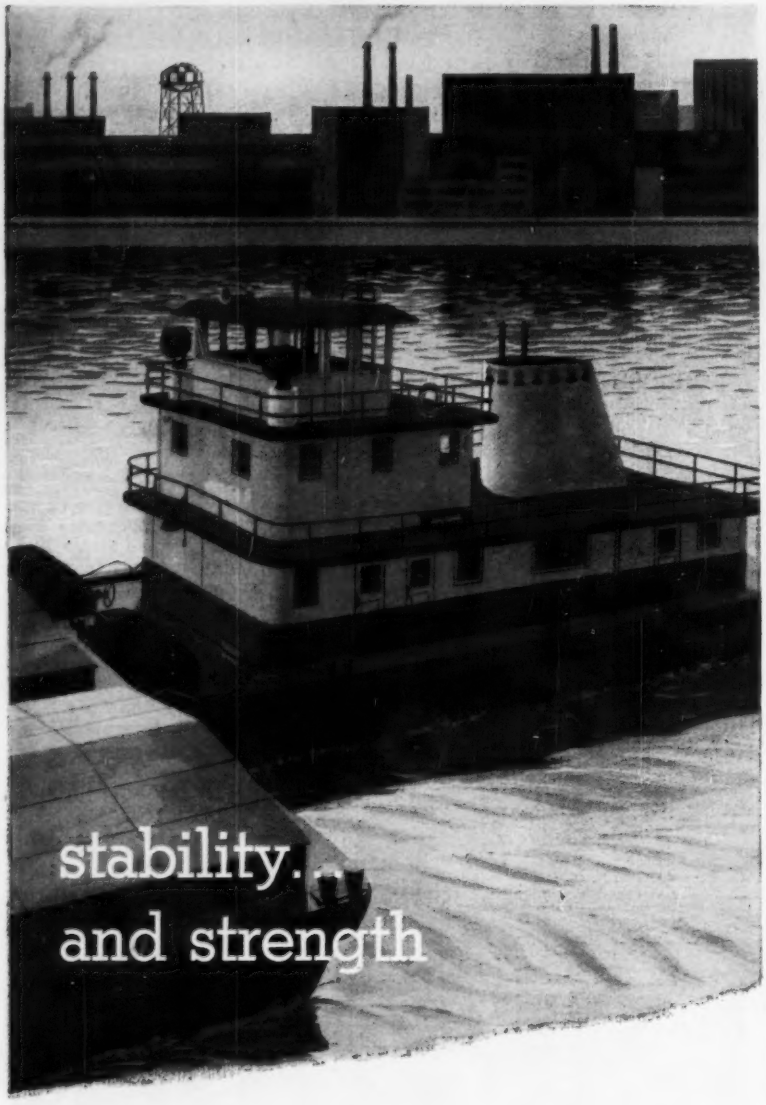

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prevents spotting and subsequent corrosion of metals. It's tradenamed Entek 45, is used at the rate of 1 pt./100 gal. of rinse water.

•

Soluble Solder: Fusion Engineering (17921 Roseland Ave., Cleveland) has a new water-soluble solder flux for automatic dip soldering printed circuit boards. It's called 14-E Soldering Flux, is designed for electronics applications requiring zero conductivity. It's completely soluble in water either before or after soldering, and is said to eliminate any conductive or corrosive residues.

•

Reduces Rubber Marks: A new sealer, Hi-Polamur Floor Seal, has been developed by Multi-Clean Products (St Paul, Minn.) for wood and concrete floors. The sealer is said to be extremely resistant to black-marking and rubber burns, is available in 55-, 30-, 15-, 5- and 1-gal. containers.

•

New in Urethanes: Poly-Form Manufacturing Co. (Box 305, Escondido, Calif.) is now in the urethane coating business. It is retailing coatings for $5/gal., and a thinner at $1/qt.

•

Hygienic Plastic Sheet: Campo Division of Chicago Molded Products (1020 Kolmar Ave., Chicago) is now offering extruded plastic sheet with bacteriostatic protection "built-in." The antigerm feature was worked out by Campo and Sanitized Sale Co. of America. Possible uses for the sheet: baby toys, baby bath tubs, tissue dispensers, cake covers, etc.

•

Drycleans Masonry: Brick Research Associates (604 West Dartmouth, Kansas City, Mo.) has a new dry acid masonry cleaner. It's called Devil-Powder, contains boron and is used for removing excess mortar and lime from brick, tile, stone, glass, aluminum, stainless steel or copper.

•

All-Synthetic Hydraulic Fluid: Monsanto Chemical's new all-synthetic hydraulic fluid, tradenamed Pydraul A-200, is described as a compound based on halogenated hydrocarbons. It is said to offer extreme fire resistance and to be compatible with all other commercially available all-synthetic fluids. It sells for $2.85/gal. in tank-car quantities.

CHEMICALS OUTLOOK

April, 1959

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

GEISMAR WORKS' CHLORINE-CAUSTIC PLANT ON STREAM!

Wyandotte's new chlorine–caustic soda plant is now in operation at our new Geismar Works immediately south of Baton Rouge, Louisiana. With a designed daily capacity of 300 tons of chlorine and 330 tons of caustic, this new facility — along with the output of Wyandotte (Michigan) plants — will establish Wyandotte among the top three manufacturers of merchant chlorine when full production is reached.

Among many new features in the plant are 30,000–ampere rectangular diaphragm cells which give maximum production efficiency and flexibility.

Pipeline–loading facilities on the Mississippi River for barges and ocean tankers are complete for caustic soda . . . the plant is linked to industry by modern highways and railways. Wyandotte is ready to serve Southern producers of petrochemicals and petroleum, pulp, paper, and textiles, as well as rayon, detergents, nonferrous metals and a host of others relying upon process chemicals.

ADJACENT LAND AVAILABLE FOR OVER-THE-FENCE SUPPLY

Representing an investment by year–end of about $37 million, the combined ethylene oxide–glycol and caustic–chlorine facilities at Geismar cover approximately 100 acres of the 1200–acre tract. A major part of the remaining land is available for sale or lease to other companies which may find it economically advantageous to build plants which can receive chemicals "over the fence." A wide range of chemicals is available. And there are ready sources of water, electric power, natural gas, and abundant raw materials.

For details on how you can benefit from Wyandotte's new Southern source for chemicals, write: Wyandotte Chemicals Corporation, Dept. CO, Wyandotte, Michigan.

ETHYLENE OXIDE-GLYCOL PLANT BACK IN PRODUCTION

Rebuilding of the ethylene oxide–glycol facility at Wyandotte's Geismar Works is now completed, and the plant is operating near capacity. Disabled by an explosion and fire November of last year, thorough investigation shows that the basic manufacturing process is sound, and the plant is a safe one to operate. It utilizes a new process for the direct oxidation of ethylene to ethylene oxide — the first of its kind in the U.S. . . . has an annual capacity of 60 million pounds.

Wyandotte CHEMICALS

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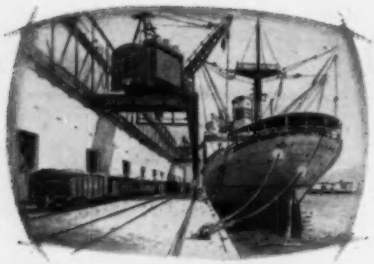

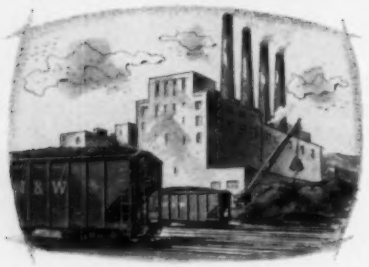

3 Facts you can't overlook when you're LOOKING OVER NEW PLANT SITES

According to latest figures in the September, 1958, issue of the "Statistical Abstract of the United States" . . .

1. U. S. exports of chemicals and related products totaled $1,395,000,000. *Your new plant can effectively reach this huge overseas market if it is located in the Land of Plenty. These 6 great states served by the Norfolk and Western Railway offer direct rail connections to extensive modern facilities at the Port of Norfolk on famed Hampton Roads. Over 8,000 vessels a year sail from Norfolk and the Hampton Roads area.*

2. The dollar value of electrical energy purchased by manufacturers of chemical and related products led all other major industry groups with a total of $449,000,000.

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Allied's executive committee (left to right): Henry M. Minton, Glen B. Miller, Chairman Kerby H. Fisk, Harry S. Ferguson, Eugene Meyer and C. W. Nichols, Sr.

Over the past two years, Allied Chemical has overhauled its management structure, shifting 68 top executives into new posts. Because of its unique position—one of the giants of the U.S. chemical industry and probably the world's biggest supplier of basic chemicals—these changes have implications for the entire industry. Told for the first time on the following pages is the story behind these shifts, the men responsible for them and what the changes augur.

Behind the Regrouping at Allied

Operating Committee Reverses Holding Company

Next week, Allied stockholders will be receiving reports of first-quarter earnings. And they'll be getting a happier message than they did from the '58 annual report they received last month.

Like many other firms, Allied was hit hard in '58. Sales were off only 7%. But profits were down 22%. Things are looking up, however. It would not be surprising if income in first-quarter '59 not only made up all of the first-quarter '58 decrease but actually showed an increase over first-quarter '57.

At least six of Allied's management people are getting a special glow from this realization, for they called the turn. They're the members of the company's executive committee and they know that more happened last year than can be told in an annual report.

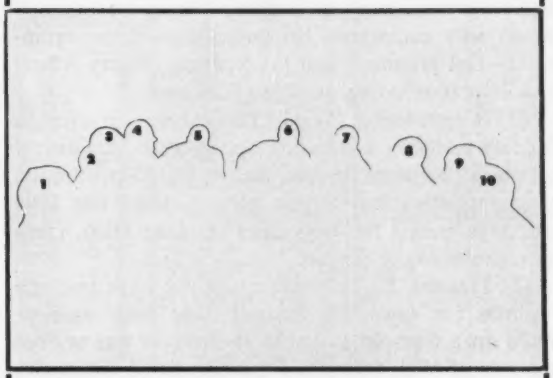
They know, for example, that most of the drop in '58 resulted from lagging demand for the basics; and sales of coke, sulfuric acid, soda ash and other large-volume materials began picking up last summer, are going better now than in well over a year.

They also know that new projects, Caprolan nylon and polyethylene, are starting to pay their own way. A uranium hexafluoride plant—Allied's first venture into nuclear processing—is due to start up any moment, will add to sales and profits. Other projects, now in the laboratory, hold promise of long-term growth. Included: new polymers and copolymers for coatings, films, fiber, and for floor tile and other building jobs.

But, more important, they are intimately acquainted with the management recasting that revamped the organization chart, put 68 top executives into new posts. They're familiar, moreover, with the company's new approach to research and, in fact, a new outlook on corporate life.

Approach

These are the men who are tightening ties between the divisions:



1. **William H. Winfield** — *president, International*
2. **H. Dorn Stewart** — *president, Barrett*
3. **Thomas J. Kinsella** — *president, Plastics and Coal Chemicals*
4. **I. H. Munro** — *president, Solvay Process*
5. **Carlton Bates** — *executive vice-president*
6. **Harry S. Ferguson** — *executive vice-president*
7. **A. E. Scherm** — *president, Semet-Solvay*
8. **Chester M. Brown** — *president, National Aniline*
9. **Irb H. Fooshee** — *president, General Chemical*
10. **Mayor Fogler** — *executive vice-president, Nitrogen*

CW Report

Highlighting last year's organizational surgery was the carving of the Plastics and Coal Chemicals Division out of the Barrett Division. Headed by Tom Kinsella, president of the old Barrett, the new division produces benzene, naphthalene, phenol, phthalic anhydride and melamine (among other resins). Barrett retained paving, roofing and construction materials. Barrett's chief is H. Dorn Stewart, a former Armstrong Cork marketing manager, who looks with glee on forecasts of a $450-billion building boom in the '60s.

In research, there's a planned effort to acquire outside know-how that could pay off faster than captive scientific work. An office in Europe is a clear-cut attempt to aggressively seek out foreign developments.

Also in the offing are more cooperative ventures, such as the recent agreement with Food Machinery whereby Allied acquired a share in the former's South Charleston, W.Va., carbon bisulfide and carbon tetrachloride facilities. This plant, in fact, is already scheduled for expansion.

All of these changes are symptomatic of the new look at Allied, and all bear the imprimatur of the powerful executive committee—itself an innovation. Formed in '57 to replace the company's executive and finance committees, the executive committee is the firm's senior governing body and representative of the board of directors.

Makeup of the committee is half "inside" (officers of the company) and half "outside." Kerby Fisk, chairman of the board as well as of the executive committee, explains it this way: "You must have 'inside' members, of course. But, unless you have 'outside' views, too, you are sitting in judgment of your own decisions."

The decisions brought before the committee since its

inception have been many and far-reaching. To appreciate their impact, you must view them against the backdrop of Allied's management history.

In the Beginning: The story of the early Allied has been told ably and often in the general business press. Basically, it's a story of Orlando Weber, the brilliant, wondrously competent, but autocratic—almost tyrannical—first president, and his successor, Henry Atherton. Important points are these policies:

(1) Organization. Allied Chemical was, in effect, a holding company controlling Solvay Process, General Chemical, National Aniline, Barrett and Semet-Solvay. Communication was largely vertical; there was little exchange among the companies of information, common problems, or people.

(2) Finance. Earnings were not put back into the business for expansion. Instead, they were used to build up a financial structure so strong it was at once the awe of Wall Street and the despair of those who thought the firm should be expanding more rapidly. The company won handsomely on a big ($50 million) gamble at Hopewell, W.Va., on an ammonia project. After that, it was nothing ventured, nothing lost.

(3) Research. The research budget was kept low and directed mostly at reducing costs of existing operations. Weber presumably felt that Allied's forte was making basic chemicals, that more research would put Allied in the position of competing with its customers.

(4) Public relations. In the tradition of early chemical industry, Allied liked to keep its affairs pretty much to itself. The public, stockholders included, got precious little information about the company. Employees were strongly discouraged from taking part in the activities of societies or the rest of the industry.

A Decade of Change: Big changes started to take place when Fred Emmerich took over the presidency in '46.

Shortly after Emmerich became president, a change in tax procedures made it more profitable to operate subsidiary companies as divisions. He took advantage of the change to start bringing the subsidiaries into the company as divisions. He also started to expand the corporate structure.

Financial policies were liberalized. For example, in '37, Allied's ratio of current assets to current liabilities was 10 to 1. (Du Pont's was 7 to 1; Union Carbide's was 4 to 1.) By '47, it was reduced to 5 to 1; by '51, 2 to 1. It now fluctuates near 3 to 1. The company embarked on a heady spending spree that was to triple the size of Allied's plant: At the end of '45, Allied's property was carried on the books at $282.1 million. By the end of '56, Emmerich's last full year in office, it was up to $887.2 million. The climax was reached in '53, when Allied broke with tradition by actually going outside to borrow $200 million (*CW, Feb. 14, '53, p. 17*).

Emmerich took a lot more interest in research. The Central Research Laboratory in Morristown, N.J., was completed in '47 and later enlarged. The divisions all put up new laboratories. The research budget, which was $3 million in '39, was increased sharply—to $14.5 million by '53. Two research men, Forbes Silsby and Glenn Nesty, were made vice-presidents.

Gregarious Emmerich became one of the best known (and liked) men in the chemical industry. He also encouraged others in the company to participate in industry affairs.

STAFF AND LINE

There's no tendency on the part of anyone at Allied to fault the administrations of Weber or Atherton, let alone Emmerich's. And, in fact, it's hard to knock a company that sailed through the economic hurricane of the '30s as though it were in the eye of the storm; that has maintained its position as the world's biggest supplier of basic chemicals; that has unquestioned technical competence; and that has never failed to make money.

But it remained for Glen Miller, who succeeded Emmerich in '57, to completely dissolve the traces of the holding-company approach, to break down division barriers and to superimpose a modern management organization on the corporation.

Right from the start, Miller liked the idea of giving the divisions maximum autonomy in production and sales. At the same time, he could see much wasted effort through duplication of activities, the absence of standardized procedures, and a general lack of coordination.

His answer was the staff-and-line organization (*see page 55*). This, he feels, gives the divisions as much freedom as possible while consolidating those services that can be performed most efficiently at the corporate level.

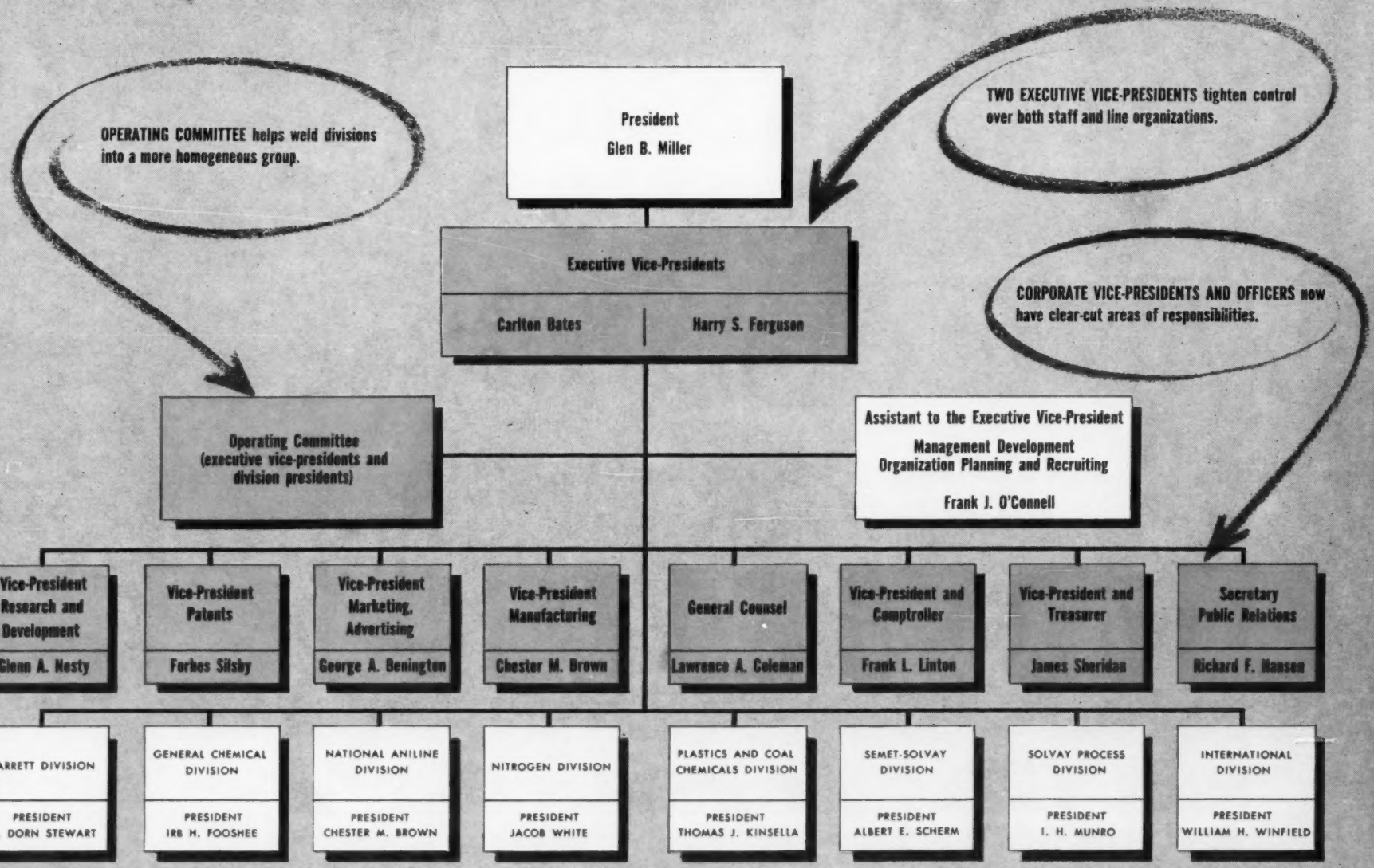
Two at the Top: Not shown in the chart is Kerby Fisk, chairman of the board and of the executive committee. That's largely because it's difficult to put down the relationship between Miller and Fisk on an organization chart.

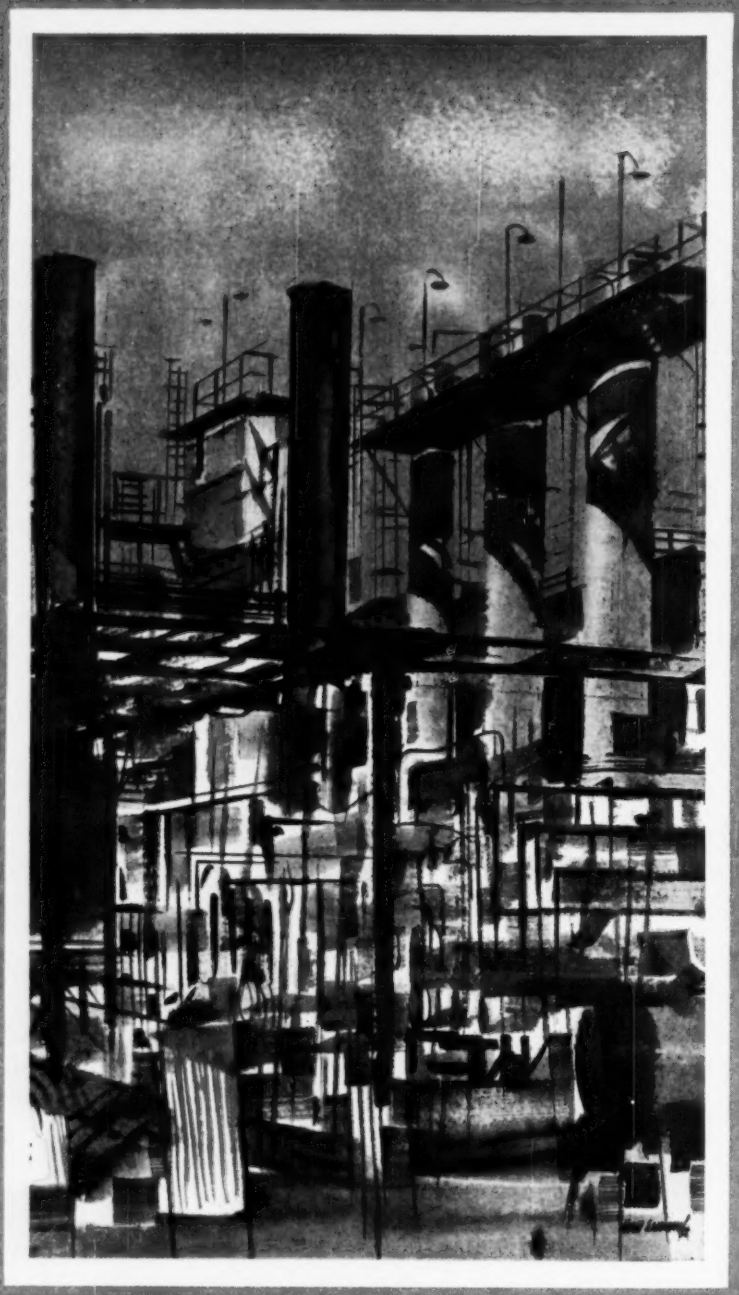
Says Fisk: "When we amended the bylaws of the corporation in '57, we agreed that Glen would be the chief executive officer. I guess you'd say that whatever the chief executive officer doesn't do around here, I do."

Fisk, who is 55 and looks younger, holds a B.S. in chemistry and mathematics (Harvard, '26). But his strong suit is finance. An ex-vice-president of Prudential Insurance Co., he looks after the financial interests of Eugene Meyer—a big Allied stockholder and publisher of the *Washington Post and Times Herald*—Fisk, at the behest of the directors, has been spending practically full-time at Allied.

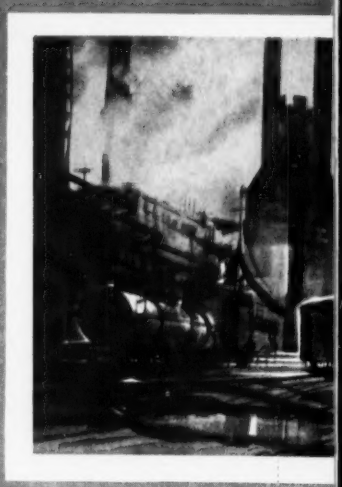
Says Miller of him: "Kerby is quick and incisive and always available for consultation. It's a big help to have someone in the company whose judgment you

Allied's New Staff-and-Line Management Structure

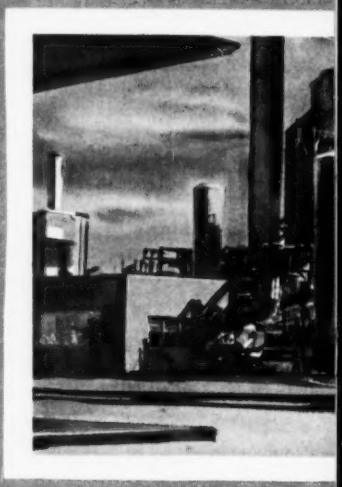




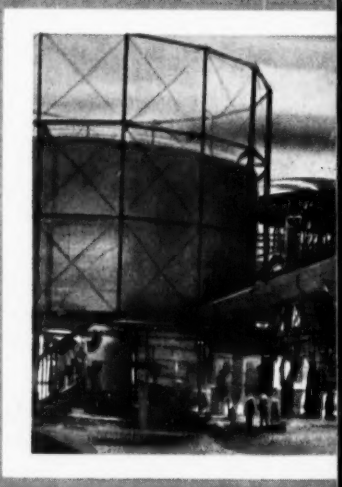
Isocyanates come from National Aniline, Moundsville, W.Va.



Coke-making facilities at



Caprolan fiber plant at Ch

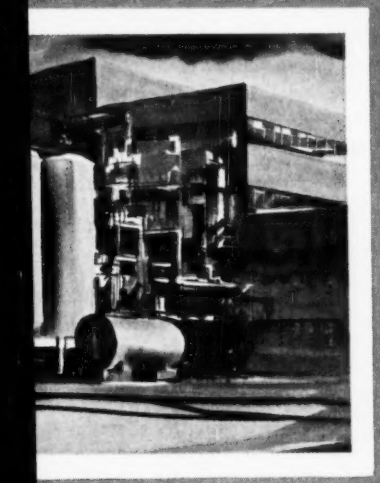


Fertilizer basics are made b

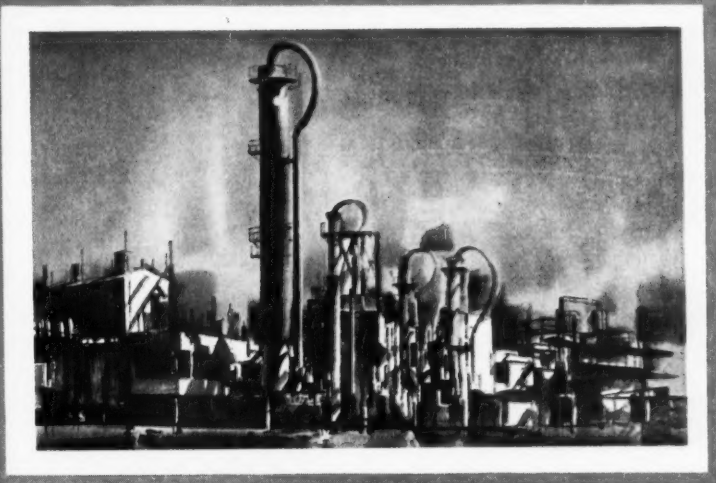
Allied's Changing Billion-Dollar Plant

awanda are Semet-Solvay's.

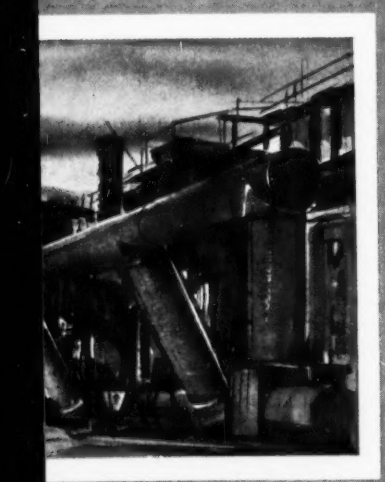
Chlor-alkali plant at Solvay, N.Y., is operated by Solvay.



rfield, Va., is National unit.



Caprolactam monomer unit at Hopewell, Va., is National plant.



itrogen Division, Hopewell.

THE water-color sketches on these pages (done by Hugh Laidman of Buffalo) sharply point up the fact that Allied has changed more than its management structure. It has changed its product mix, too. At the end of last year, the company's capital investment (cost value) amounted to $992,834,164. Large-volume basics—sulfuric acid, soda ash, coal chemicals—still account for a significant portion of this. But new plants for new products are springing up to complement them. Thus, alongside of the Nitrogen Division's plant at Hopewell, Va.—the largest installation in the country for making fertilizer materials—National Aniline has put its new caprolactam monomer unit. At Tonawanda, N.Y., Semet-Solvay makes coke and coal chemicals —and its new polyethylene resin.

respect, someone with whom you can exchange views."

That doesn't mean, however, that Miller doesn't make his own decisions. Once he makes up his own mind, he acts quickly and without regrets. He has the reputation of being a quick reader, fast worker.

In many ways, Miller offers a sharp contrast with his predecessor, Emmerich. He lacks the latter's outgoing nature, for example. But he has confidence in his own capabilities. And behind Miller's soft-spoken facade, there's a fierce pride in his stewardship, a conviction that he has—for better or worse—brought the divisions and the head-office people closer together.

The Line: In keeping with the policy of giving the divisions maximum autonomy, Miller has set up an organization in which the divisional presidents report directly to the two executive vice-presidents, Harry Ferguson and Carlton Bates. An operating committee (*pp. 52-53*), comprised of the two executive vice-presidents and the divisional heads, has been set up. Regular meetings are held once a month. In addition, there's a steady exchange of information among the members at informal meetings and luncheons.

The Staff: Reporting to Miller in the staff as well as the line organization are the two executive vice-presidents, Bates and Ferguson. Like Miller and Fisk, they work closely together and each can take over the other's functions. In the normal course of events, however, Bates is largely concerned with production, research and marketing, while the comptroller, general counsel and treasurer and secretary are in Ferguson's area.

Bates came up from Solvay Process, where he had been president, to become vice-president in charge of manufacturing for the corporation. That was in Feb. '57. On the first of December in the same year, he was named executive vice-president.

In many ways, his nomination to vice-president was a significant step for Allied: it signaled the arrival of a manufacturing man in corporate management. "It gave the divisions a focal point of interest," is the way Chester Brown, who has the job now, puts it.

Likable and highly respected, Bates takes a simple, direct view of the present setup: "Basically, we're trying to coordinate—to eliminate overlapping where it's unnecessary, leave things alone where it is. Our job is to make a good product and sell it at a profit. This is getting harder to do because prices are coming down and costs are going up. So we're analyzing everything and trying to improve performance down the line."

His counterpart, Ferguson, was head of Allied's legal department for 17 years, has been a vice-president since '51, was named executive vice-president at the same time as Bates. He's also a member of the executive committee and of the board. He's actually the architect of the new corporate structure, was given a free hand, subject to approval by Miller and Fisk.

But he eschews the word reorganization, prefers "regrouping." "We've merely regrouped our forces to provide an atmosphere in which they'll be able to put forth their best efforts," he says.

Ferguson is not averse to taking a leaf from other companies inside or outside the industry ("We like good ideas no matter where they come from"). Du Pont, in particular, he feels, "runs a good show." But although the new organization is patterned somewhat after Du Pont's, it is not as formalized. "After all," says Ferguson, "we're not as big as they are."

A lack of formality between the staff and line organization could well lead to fuzzy lines of responsibility, one of the things that Allied is trying to avoid. I. H. (Ike) Munro, president of Solvay, sums it up with this anecdote: "Larry Coleman (general counsel) and I were discussing the duties of a young lawyer who was being transferred to a Solvay location. I told him 'I don't care who his boss is, just so long as he remembers who his client is'."

RESEARCH

Research, better than any other function, points up the willingness of present Allied management to second-guess itself in its quest for results. When Miller took office, and for a year and a half thereafter, both Forbes Silsby and Glenn Nesty were vice-presidents charged with research. Nesty was concerned with high-priority products. "I was vice-president in charge of nylon," he says.

Last year, in what appears to have been dissatisfaction with its own progress, Allied decided to overhaul research management at the top. Nesty was given complete responsibility for research. He'll probably be named a director later this month. Silsby, as vice-president, spends full time bringing along the firm's polyethylene project and supervising patent activities. The post of research director was created and Cortez Hackett, vice-president of Solvay, was named to fill it.

Hackett—a standout administrator—reports directly to Nesty, frees the latter of many administrative chores. They work closely in directing activities of the Central Research Laboratory and in coordinating divisional research.

Last fall, the plant design function was cut loose from Central Engineering. "This," Nesty says "was completely in keeping with the policy of giving the divisions responsibilities for their plants.

"By the time designers and draftsmen are needed, the projects should be in the hands of the division that's going to run the plant," Nesty maintains. "We'll have a small engineering organization as a part of research. It will give the creative people more time in which to create."

Ready to Buy: At the same time that Allied streamlined its research management structure, it decided to review its whole philosophy of research. Officials compared their own painstaking development of nylon-6 with Chemstrand's quick success with nylon-66

through Du Pont know-how. Allied people are proud of their nylon developments. But they decided they were missing a bet by not being more aggressive about buying processes.

So they revised the research philosophy, making it a point of policy to actively seek know-how through either purchase or exchange. A direct result of this was the European office set up in Brussels last fall. It's staffed by two men, Grant Sita, who's in charge of the branch and sales activities, and J. Ross Tuttle who carries the title of "technical director of Allied's European operations." Actually, Tuttle is there to spot European developments that might tie in with Allied's activities.

Merely More Active: This change could be construed as confirmation of a theory that credits Allied research with blazing few really new trails in chemistry. Its proudest achievements have been nylon-6, low-molecular-weight polyethylene (wax), high-density polyethylene, phenol-from-cumene and a nonelectrolytic method of making hydrogen peroxide. With the exception of the unique polyethylene wax, the reasoning goes, processes in each case were available in this country or in Europe, and Allied might have saved time and money if it had purchased know-how.

Allied's failure to do so has given rise to two allegations. The kinder one has been that Allied was a do-it-yourself firm, too proud to go shopping for processes. The harsher view is that Allied was a me-too firm whose best efforts were directed at circumventing other people's patents.

Neither of those comes close to the mark, declares Nesty. "Who can say when a certain development originates?" he asks. "There is, when you come right down to it, very little new chemistry involved in most 'new processes.' It had been known for years that hydrogen peroxide could be generated by oxidizing a quinone-type material, or that phenol and acetone could be split out of cumene. The only real contribution a chemical company makes is to translate the chemistry into an economical process and then install the process in a plant. This we have done. And from what we can tell, our processes are head and shoulders over anything our competition has. If we had it to do all over again, we'd do exactly the same thing."

High-pressure polyethylene, however, represents at least one exception to this declaration. Allied had an opportunity to get into production during World War II (when Carbide and Du Pont did). "We missed a bet," Nesty admits ruefully.

As far as "firsts" are concerned, Nesty points to the pioneering work by General in fluorine chemistry, at several firsts in nylon-6 (including the first successful nylon-6 tire cord) and at the development of a continuous process for making titanium. (Like other companies, Allied has shelved its titanium plans because of the drastic drop in military needs for the metal.)

About Allied's increased willingness to buy processes, Nesty cautions: "We won't go out buying test-tube processes in wholesale lots. We're largely interested in seeking processes that have been adequately demonstrated. We will seek and look at embryonic developments also, but will be careful about buying them."

Search for Gold: Regardless of what Allied gets in the way of outside know-how, it's not slackening its own research efforts. The research budget was increased threefold in 10 years to a high of $17.5 million in '57. Last year, it was lowered slightly. This year, it will be increased to at least the '57 level.

A certain amount of this money continues to go toward improving existing large-volume products—where small increases in process efficiency can pay off big. Some goes toward products to round out the line and some to technical service. But much of it is being spent on a hunt for "gold mines"—new products or new applications that will open up big markets.

This effort is particularly noticeable in polymer research. Allied was not quick to jump on the plastics bandwagon. But it has been trying to make up for lost time, through its work in isocyanates, polyethylene and nylon and other polymer systems.

An acrylic fiber had been under development but this project is not now active. However, polyethylene and polypropylene fiber projects are.

And Allied may be more than casually interested in a polyester fiber of the terephthalate type. With its plentiful supply of coal chemicals, Allied would have all the xylene it would need for a project. It would be a mixture of isomers, of course, and that would mean ortho-xylene would have to be separated first. Allied now has no captive market for ortho-xylene, but it can be used in place of naphthalene in producing phthalic anhydride. This would give the firm an extra degree of flexibility—to sell or use either raw material.

All the research, however, isn't aimed at gold mines. General Chemical, for instance, has put a lot of effort into the development of transistor elements. Right now, it has a Genetron fluorocarbon resin in an advanced pilot-plant stage. Like other fluorocarbon plastics, it will be aimed at specialized markets. In field tests, for example, film made from the resin has proved valuable as a transparent moistureproof packaging material for medicinals.

Three Areas: Aside from plastics, three areas—rocket propellents, nuclear fuels and chemicals for agriculture—figure strongly in Allied's growth plans.

- Rocket propellents. Allied's goal is to be in a position to supply any fuel or oxidizer for which there's an appreciable demand. It can make boranes, hydrazine and unsymmetrical dimethyl hydrazine. It supplies fluorine (liquid oxidizer). It is, moreover, the only one now shipping fluorine. It also makes nitric acid, nitrogen tetroxide and chlorine trifluoride, all highly regarded as storable liquid oxidizers.

It makes isocyanates, of course, which are being used in solid rocket fuels. And it makes ammonium nitrate, a relatively low-performance solid oxidizer. Current research is aimed at turning up new fuels, new oxidizers and new combinations.

• Nuclear Energy. Allied has long been supplying sulfuric and nitric acids and other materials used in the nuclear program. Its first venture into the actual processing of nuclear materials is its plant at Metropolis, Ill., to make uranium hexafluoride by a new process (*CW Technology Newsletter, Nov. 1, '58*). That plant is about to start up. Also, General Chemical has an interest in thorium.

• Fertilizers. With its big stake in nitrogen, Allied is busily trying to find new ways to get plant food into a more usable form. This work encompasses complete fertilizers as well as nitrogen.

One of Many: Although the new research organization and philosophy is the most dramatic change at Allied, it's actually only one out of many. Moreover, the nature of research makes it difficult to measure progress in less than five years; some of the returns from the big push started during Emmerich's tenure are just starting to trickle in. Savings in other areas—production, marketing and consolidation of services of the legal department, treasurer and comptroller's office—show up a lot faster.

PRODUCTION AND MARKETING

Chester Brown, vice-president of manufacturing and recently named a director, is probably the only corporate manager in Allied history who also has had management experience in two divisions. He came up through operations in General to become Allied vice-president. But when Albert Cleghorn, president of National Aniline, died suddenly last year, Brown was pressed into service to take charge of that division. Nominally holding down two jobs, he actually spent most of his time with the division until last fall, when James Fox was named executive vice-president of National, freeing Brown to spend more time on corporate matters.

The purpose of his office, he says, is "not to do the manufacturing. The guts of this thing is to bring about better coordination so that we get the best use of the talents and skills we have." To that end, operating committees have been set up for maintenance, instrumentation, chemical control, transportation and warehousing, all making efforts to standardize procedures.

A central traffic office has been established. "That way," says Brown, "we have a better pool of knowledge to deal with shipping problems." Previously, for example, oleum from General was transported south in barges, which returned north empty. Caustic and ammonia were being shipped north, the barges going south empty. The Coast Guard would not give a transportation permit to allow the same tanks to carry oleum in one direction, ammonia or caustic in the other. But Allied side-stepped this by building a special double-decker barge. The same barge hull handles tanks for oleum, separate tanks for the other products.

Savings on other types of freight bills were made, too. Allied, with its large volume of basics, spends almost $100 million/year for rail transportation, has cut this 10% by consolidation of traffic.

A management engineering department was created, and Jim Armstrong, who had been consulting for Allied, was made director. Armstrong has put together a small staff of specialists who work closely with the plant industrial engineers. And even though it is small now, it has helped chalk up some significant savings.

Marketing Management: George Benington, vice-president in charge of marketing, was president of Mutual Chemical when Allied purchased that firm in '54. He continued in that job for Allied until he moved to corporate management in '57.

Benington is cautious about taking any drastic steps toward centralization of activities. "Take the field of market research. There are good arguments for and against eliminating divisional market research groups altogether. But we don't think that elimination is the best answer. What we'll probably do is set up a high-caliber, small, central staff to coordinate and advise the divisional groups."

As a first move, Allied has set up a corporate advertising department under Mike Ryan. "We have no preconceived notions about the desirability of centralization of advertising," says Ryan. "After all, advertising is an adjunct to sales, and the divisions must have control of their own sales." For the present, Benington and Ryan are making an effort to inject corporate identity into all advertising and to centralize agency dealings, other mechanics of the operation.

Says Benington, "The concept of marketing management is relatively new. It's broader than the old concept of merely sales. It takes in market evaluation, which is in turn broader than simple market research. It includes such things as advertising and trade relations."

Benington attended a recent meeting of marketing chiefs of 12 large corporations. "You'd be surprised at the variations turned up when we sat down to describe our jobs. It may take several years before the concept of a vice-president of marketing is shaken down properly."

COMPTROLLER, COUNSEL, TREASURER

The comptroller has always carried a lot of weight at Allied; the two previous occupants of that office—Emmerich and Miller—left it to become president of the corporation. The incumbent is youthful (44) Frank Linton, Allied comptroller (who also holds a law degree). "When I took over," Linton says, "I inherited a first-rate mechanical system."

In the past two years, he has tried to centralize and

standardize accounts receivable, accounts payable and the payrolls for salaried help. "We've tried to relieve the division comptrollers, formerly called auditors, of much routine bookkeeping so they can spend more time on the real comptrollership function in their divisions," he says. As he sees it, this has provided a simpler system, made for better management at the corporate level, and facilitates the movement of personnel around the various accounting departments.

More with Less: Previously, each Allied division had its own legal department. The staffs ranged from one to five men reporting to an assistant secretary. The headquarters legal division reported to the company secretary.

When the bylaws were amended and Miller became president, the position of general counsel was created. Larry Coleman, who had been head of the legal division, was given the job. Under Coleman, there's a legal director and three assistants. Divisional legal departments have been eliminated. The total staff now consists of 15 men. This, as Coleman points out, is five fewer than needed under the old setup. "It has eliminated a lot of duplication of effort," he says. It also puts them in a better position to deal with problems that affect the company across the board (workman's compensation, food additive laws, leases, zoning regulations, etc.).

Savings have also been brought about in the treasurer's office. Formerly each division had a separate credit department and a separate treasurer. "It clearly makes sense to centralize the treasurer's office, which is largely a service," says James Sheridan, Allied's treasurer. "It's the same way with credit. But there had been some overlapping. And there was a lack of uniform credit policies. By centralizing these, we've been able to eliminate overlapping, standardize procedures and do a much better job at the top while not impinging on the divisions' autonomy."

"With divisional credit departments" he adds, "some of them were so small, they did not give the personnel room to develop. Now we can do the job with fewer people. But there are more responsible jobs."

OUTSIDE THE CHART

Some of the changes at Allied just don't show up on any organization chart. And, in some ways, they are even more important than the ones that do.

"If you want a quick summation of the change," says Secretary Dick Hansen, "it's this: the injection of more personality into the company."

Symptomatic of the change, Hansen feels, is the greater participation in industry affairs. Ten years ago, for instance, no one from Allied was on a Manufacturing Chemists' Assn. committee. Now, 18 people (including Miller, Ferguson, Coleman, Linton and Hansen himself) serve in key posts. In the same vein, he points to an increased willingness on the part of Allied management to talk to security analysts, the press and, in fact, the public in general. He thinks, too, that the new feeling shows up in divisional people taking a more active interest in affairs of other divisions.

New Personnel Policy: Another change that doesn't show up strongly on an organization chart is Allied's attitude toward personnel. One of Ferguson's first acts when he became vice-president in '51 was to call in Frank O'Connell from General Chemical as his special assistant on management development and recruiting. Together, they hammered out a new personnel policy. Some of the significant aspects:

A management development program was instituted for supervisory, sales, administrative and technical personnel. Job descriptions were made and a color-coded organization chart drawn up. Everyone on the chart is analyzed by his immediate supervisor and next higher-up. (They're experimenting with having the individual analyze himself.) Finally, a development program is laid out for each individual according to his particular needs.

One of Ferguson's pet projects: all supervisory personnel, regardless of length of service, must take a continuous four-week* vacation every three years. "It assures the manager of a fairly extended rest period," he says. "It also forces him to get his affairs straightened out and his desk clear, knowing that someone else is going to take over. But more important, it gives his assistant experience in running the job and gives us a chance to see what his needs are."

Each department now puts together a long-range personnel plan. Length varies, but averages three years. At the end of each year, estimates are reviewed and another year tacked on. By knowing who is retiring and the average age of various management levels, the department head has a better idea of what his needs will be.

Salaries in the industry have been surveyed and a uniform rating system set up for the company. The limits for a job are prescribed by the variations of that particular job in the industry. Average performance qualifies for the midpoint. Superior performance pushes the job near the upper limits. An employee can find out what the range for his job is. O'Connell keeps the scale up-to-date through surveys. So far, he has conducted two in three years, plans another one this month.

Vacation plans were brought up-to-date last year (two weeks after six months, three after 10 years; four after 25). A new group insurance plan was put into effect (about twice the annual salary). Pension and medical insurance plans were liberalized. A major medical insurance plan was instituted last year. A stock option plan was started; about 125 management men were eligible. Late last year, it was broadened

*Du Pont has a similar plan involving a six-week vacation.

to enable 288 management men to participate.

A conscious effort has been made to make promotions from within the corporation rather than merely within the division. In '57, about 50 men were switched from one division to another; last year, over 60.

College recruiting was centralized in agreement with the divisions. In the past, it had not been unheard of for divisions to be competing with each other for likely candidates. Now, O'Connell's group handles all recruiting, makes recommendations. Actual hiring, however, is still done by the division.

GEARED FOR GROWTH

Despite Fisk's and Miller's high hopes for '58, Allied was hit even harder than most chemical companies by the business downturn last year.

Sales were off from the '57 high of $683 million, to $635.5 million. Net income (excluding profit on sales of marketable securities) was down from $43.4 million, to $33.8 million. But the firm made a good showing during the fourth quarter. Although sales and operating revenues ($161.8 million) were up only slightly over fourth-quarter '57, income ($10.8 million) was up 3%.

That's still short of what the firm can do. It now has the capacity to generate $900 million worth of sales yearly. And due largely to its recent spending, its cash flow (retained earnings plus depreciation) will top $60 million annually for the next several years. Because of present overcapacity in many of its lines (ammonia and phthalic anhydride, for example), Allied will not be putting money into those fields. Even so, it should have capacity to produce $1 billion worth of goods by '61.

The Nitrogen Division, cut out of elements of Solvay and the former Barrett Division during Emmerich's regime, presents a problem to Allied. Last year, it accounted for 10% of Allied's gross. The figure could have been even higher if the plants had been able to operate at capacity. Officials are hopeful about the long-term promise for ammonia, although they've resigned themselves to the fact that things will never be as good as they were in the '30s and '40s, when Allied had things all its own way in ammonia.

For the immediate future, they're trying to put ammonia into a greater variety of end-products. Pebbled ammonium nitrate in '57 was one result of this effort. Fertilizer research has a high priority.

Industry-wide overcapacity will prevent Allied from reaching sales of $1 billion until the '60s. The expectation is that '59 will put the company back at its '57 level of $680-million sales.

Eyes Overseas: If some of the products now in the labs catch on, the whole timetable might be tightened. Another factor that could hasten higher sales is overseas trade; for Allied is decidedly international-minded these days. The International Division, now headed by Bill Winfield, handles all overseas sales, which formerly were dealt with by the divisions themselves. Last year, Allied Chemical Canada Ltd. was set up to consolidate subsidiary operations in that country.

Pegging Latin America as its most attractive foreign market, Allied established offices in Mexico and Peru; another will probably be placed in the Caribbean. The second most attractive market, according to Winfield's calculations, is Europe. That's why the new office was set up in Brussels. The next move will probably be into the Middle East, although Australia is also getting close scrutiny.

What's the Gain? Despite the obvious effort that has been made to pump new life into the corporation, Allied has not silenced its critics completely, of course. Some financial people, in particular, are skeptical about the firm's growth potential. They admit that Allied is paying a lot more attention to research than it ever did before and that the purse strings have been loosened to accommodate new projects. But they want to see more substantial proof that the research will bring results and that the money for new plant has been wisely spent.

They point out, too, that while there are many new faces on the Allied organization chart, the three top operating management men (Miller, Ferguson, Bates) and a number of others are long-time Allied employees. And they put considerable stock in the old saw about old dogs and new tricks. There's a feeling, too, that while the higher echelon of management is generally in harmony, there's been restlessness in the middle management ranks. This may have been the reason why Hugo Reimer, popular president of the Nitrogen Division, and Allied parted company last May over a "policy difference."

Exactly how valid the criticisms are remains to be seen. Much, naturally, depends on how well the firm carries through on its present course, how quick it is to recognize mistakes and rectify them.

A good deal depends, too, on the selection of the next president. Miller is on record as saying he will retire when he turns 65. That will be next September. Just who his successor will be is an open question. Allied's history would indicate the promotion of an accountant or a lawyer to the key post. However, it might turn out that an operating man will get the nod. A significant aspect of the new organization is that two such men, Bates and Brown, hold down top spots in the corporation. Bates can probably be ruled out because of age. That still leaves Brown—with experience in two divisions and corporate management as well as being a recently appointed director—as a man to watch.

There are, of course, any number of likely candidates for the job. Whoever gets it will have his hands full. Emmerich planted the seed of change. Miller is nursing it, helping it grow. The next president will be expected to reap a harvest.

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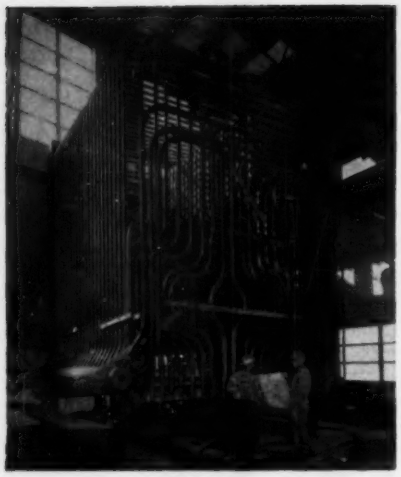

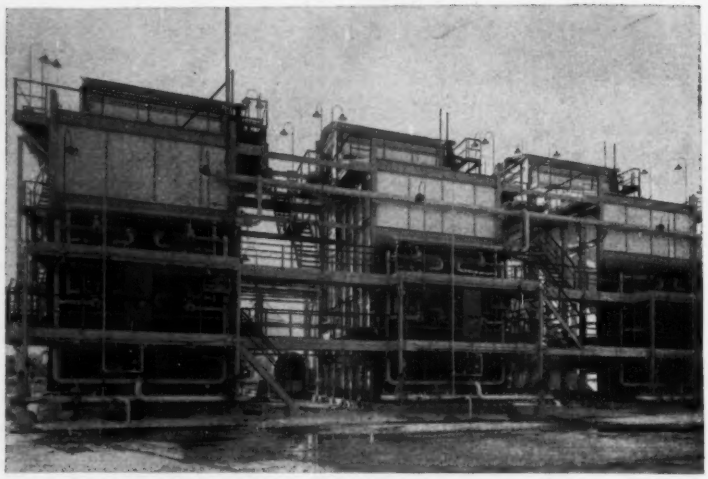

AT LEFT: Installing a 60,000 lbs/hr unit in a brewery

ABOVE: A battery of 125,000 lbs/hr units in a chemical plant

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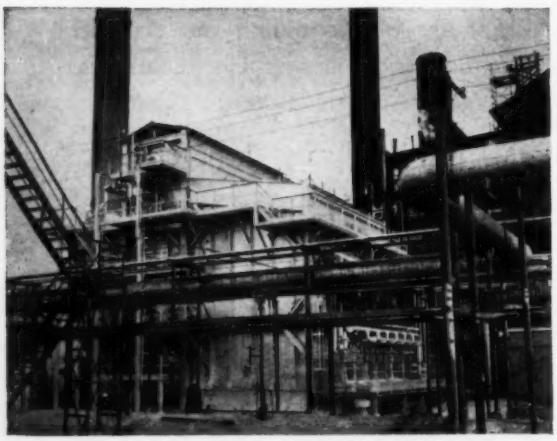
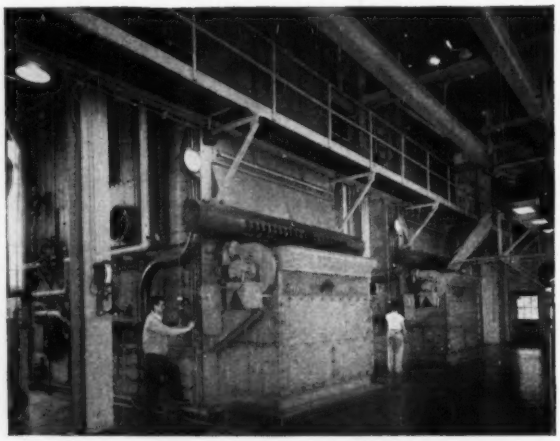


This 400,000 lbs/hr unit is installed in a leading petroleum refinery



Three 40,000 lbs/hr units serve a medical center

CW PHOTO—SYD KARSON

Data in hand, McKesson Vice-President Dean Hildebrandt is . . .

Planning Bigger 'LCL' Sales

Plans for acquisition of Barada & Page, a major West South Central chemical distributor, are in full swing this week at McKesson & Robbins' Chemical Dept. McKesson — the nation's largest chemical distributor — will take over B&P toward the end of June, by a joint exchange of stock.

Like its acquisition last September of Merchants Chemical Co., a large Eastern distributor (*CW, Aug. 30, '58, p. 46*), its latest move is a step in plans to more fully realize the potential of the less-carload-lot market. It's the conviction of the department's chief, Vice-President Dean Hildebrandt, that the lcl. market is vastly larger than currently realized $1.2 billion annual sales indicate.

To cash in on the lcl. market potential, McKesson is planning more than the B&P merger. The firm will probably develop several new locations for its already-extensive network of district offices, branch sales offices and warehouses. And it's planning a sizable increase in bulk packing of solvents and mineral acids; intensifying activity aimed at selling three or four more products to each account.

The Merchants merger gave McKesson an estimated annual sales volume of $41 million. The B&P acquisition, plus normal annual sales growth, should give McKesson's chemical department some $60 million in sales this year. And, if current growth rates (exclusive of mergers) continue, the department's annual sales should top the $100-million mark within 5-10 years.

The B&P acquisition is, of course, a major step toward that figure. It will provide McKesson with the means of cracking the highly competitive West South Central market area—an area where some 190 industrial chemicals and explosives wholesalers now operate. Recent and planned expansion of the CPI in that area, especially in the field of petrochemicals, point to growing lcl. markets. Hildebrandt estimates that his department alone will be doing at least $25 million worth of business in the West South Central area within five years.

Although McKesson operates a district office and warehouse in Houston and branch offices and warehouses at several other spots in the West South Central states, its coverage is far from complete. Much of McKesson's volume now stems from feed additives, which account for 50-80% of sales in three major locations. Some 66% of all McKesson Chemical's volume is generated east of the Mississippi.

To crack the West South Central industrial lcl. chemical market, McKesson would have to meet strong local competition in specific areas and buck large multistate distributors such as Thompson-Hayward and Central Solvents. The acquisition gives McKesson a ready-made means of tapping the potential in the market quickly.

Fifty-year-old B&P is well established in mineral acids, solvents, cylinder chlorine and cylinder ammonia. And, being a vendor to refineries and well drillers, B&P is well known to the area's petroleum industry. This relationship should greatly facilitate McKesson's efforts to market organic peroxides and catalysts. And the move will greatly bolster McKesson's aim to diversify from a special chemical-feed additive distributor to a broad-line wholesaler with extensive industrial chemical business in this area.

B&P's modern physical facilities and a big truck fleet also enhance the attractiveness of the arrangement. B&P has some 500,000 sq.ft. of warehouse space, much of it added within the past five years. And the firm counts some 40 trucks in its modern fleet.

Another plus-factor in the merger is the similarity in management outlook. Both McKesson and B&P have a reputation for being conservatively managed, with tight control of costs. And both bank heavily on customer service in their sales approach. The warehouse space and truck fleets, says Hildebrandt, will prove an asset

in expanding coverage and service operations.

B&P's Gain: As the merger made sense to McKesson, so it also made sense to B&P. The latter's president, Walter Betts, sees the merger opening big markets via an expanded product line. B&P now moves about 400 different items, while McKesson counts some 600 materials in its line. The merger will put B&P solidly into distribution of feed supplements, peroxides, catalysts and other chemicals for which McKesson is now sole national selling agent.

The merger will also make it easier for B&P to sell to nationally operating customers. A company, with offices in B&P territory but with plants outside the territory, now will often be able to be reached by McKesson locations. Moreover, there's an outside chance that the combined volume of the two may make it practical for B&P to set up semibulk distribution (compartmentalized tank-wagon delivery).

Another major area of advantage for B&P stems from access to central McKesson & Robbins staff operations, such as its real estate, legal, cost accounting, traffic, advertising and credit departments.

Combined Benefits: Almost any merger produces a share of benefits common to both. Like the earlier Merchants merger, the B&P venture will make it easier for both companies to realize greater operating efficiency by paring duplicate stocks, more effective use of trucking through elimination of empty trips. And there will be greater chance to purchase at less costly carload and mixed-carload prices. An increased sales staff will facilitate market coverage. (McKesson plans to retain all B&P personnel.)

Net Result: Acquisition of Barada & Page, operating in some 13 locations, will give McKesson a total of 11 district offices, 43 branch sales offices and 70 chemical warehouses. Moreover, it will add eight bulk-packaging facilities to the current seven. B&P now repackages mineral acids, methanol, formaldehyde, acetone, benzene, toluene, xylene, ammonia, chlorine and base and tar acids.

McKesson's sales force will also expand markedly: merger will add some 50 young but experienced salesmen and sales managers to the present staff of 200. B&P executives will continue to operate at all present locations, and the Barada & Page name will be retained.

Looking Ahead: Even with the addition of B&P, McKesson will face rough competition in the West South Central states, especially from big national and regional wholesalers; e.g., Central Solvents and Thompson-Hayward, plus the 190 local distributors. But it will be no different than that faced by McKesson on a national scale.

Some 1,900 industrial chemical and explosives distributors, plus some 260 chemical agents and brokers, now operate in the U.S. And that excludes hundreds of industrial supply and other distributors that carry a few chemical lines. McKesson's $60-million sales volume is obviously only a small fraction of the total $1.2-billion wholesale market.

But the firm's current sales volume will provide a strong base for tapping the lcl. market. McKesson has consistently found that when a territory was "properly serviced," its sales exceeded by 2½-fold the best previous forecasts. That's why McKesson feels the lcl. market is largely untapped, why it's moving as fast as it can to bolster sales and service activity.

Lower Rates Hit Snag

Rail carrier proposals to establish "guaranteed rate" freight charges ran into stiffening opposition this week. The American Waterway Assn., the American Trucking Assn., and several other nonrail transport groups have requested the Interstate Commerce Commission to deny a guaranteed rate proposed by the Soo Line.

The Soo Line proposal is a volume shipment plan to give a special low rate to shippers that guarantee to send a specified percentage of their freight via rail, over a given period of time. Observers have called it a trial balloon for the rail carriers.

In the case in point, the Soo has proposed a $10.05/net-ton rate for steel pipe or tubing moving from Sault Ste. Marie, Ont., to Chicago. Conditions of the proposal included that cars be loaded with a minimum of 40 tons and that the shipper use the rails for 90% of its traffic for the pipe over a one-year period. The normal commodity rate is $12.18/-net ton.

Chemicals, Too: Chemical shippers have a big stake in the outcome of the proceedings, are in favor of agreed rates. Many chemical traffic managers believe that the industry would benefit from moves designed to lower what they regard as inflated rail shipping rates. But it's a matter of degree; few traffic men would approve of rate structures that might wipe out water carriers, leave them without alternate transportation. Currently, chemical firms now ship some 40-50 million tons of goods by rail, about 10 million tons on the inland waterways each year.

Barge carriers, with an obvious self-interest, are criticizing the guaranteed rate on a variety of points. They see the rates as contrary to the National Transportation Policy and lower than they need be to meet competition. These carriers charge that the rates discriminate in favor of large shippers. The rates they reason, are in violation of sections 1, 2, 3, 4 and 5 of the Interstate Commerce Act.

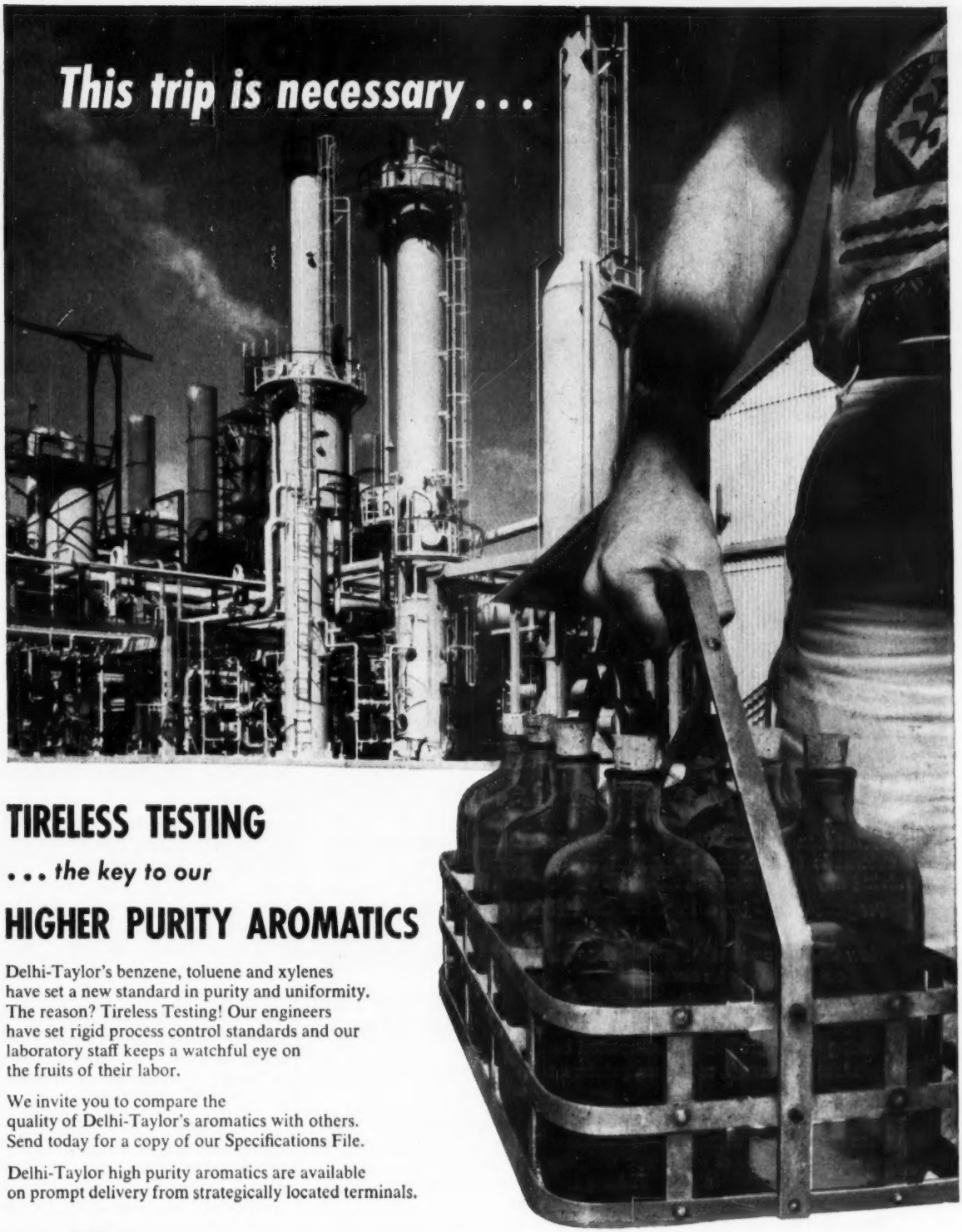
Moreover, water carriers claim that the agreed rates violate the Elkins Act, which restricts rebates to preferred shippers. And as an added factor, the carriers believe the rates break the Sherman-Clayton antitrust laws by "constituting tie-in sales and exclusive dealing contracts."

Rail carriers will, of course, counter these contentions. Last year's National Transportation Policy Act, they feel, will permit the establishment of the guaranteed charge. Moreover, rail carriers and supporters will probably marshal extensive documentation to indicate that the proposal is fair and in accordance with rail costs and profit needs.

Irrespective of what tack the ICC takes on agreed charges, it's likely that the losing side will appeal to the courts. And that will take time. Meanwhile, chemical shippers are hopeful that some form of agreed rates will take effect sometime this year.

Flying Low

The transatlantic airlines have chosen an appropriate time—May 1, the traditional moving day — to lower fares on chemicals, drugs, pharmaceuticals and medicines. These items are covered under commodity classification 6001. The rate drop for these products ranges from 19.4% to



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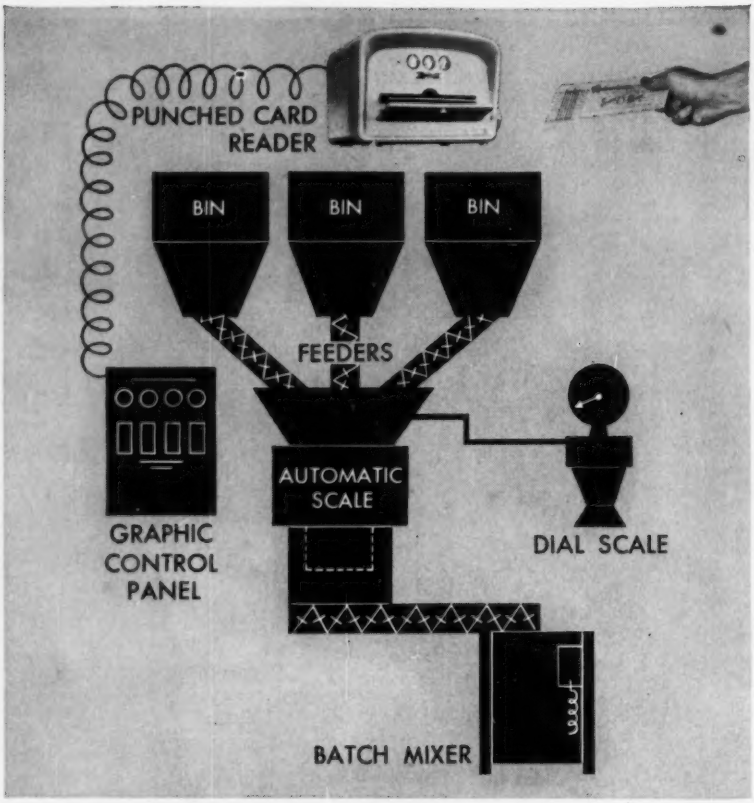

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DATA DIGEST

• **Muriatic Acid:** 44-page illustrated reference book outlines use and properties of hydrochloric acid by means of drawings, tables and graphs. Other topics include storage, sampling and dilution, health hazards, first aid measures, etc. Dow Chemical Co. (Midland, Mich.).

• **Butyl:** Catalog, 12 pages, gives applications of rubber. Charts and graphs depict resistance to weather, sunlight, chemicals and solvents, heat and age. Service tables provide performance data in various applications. The Enjay Co., Inc. (15 West 51st St., New York).

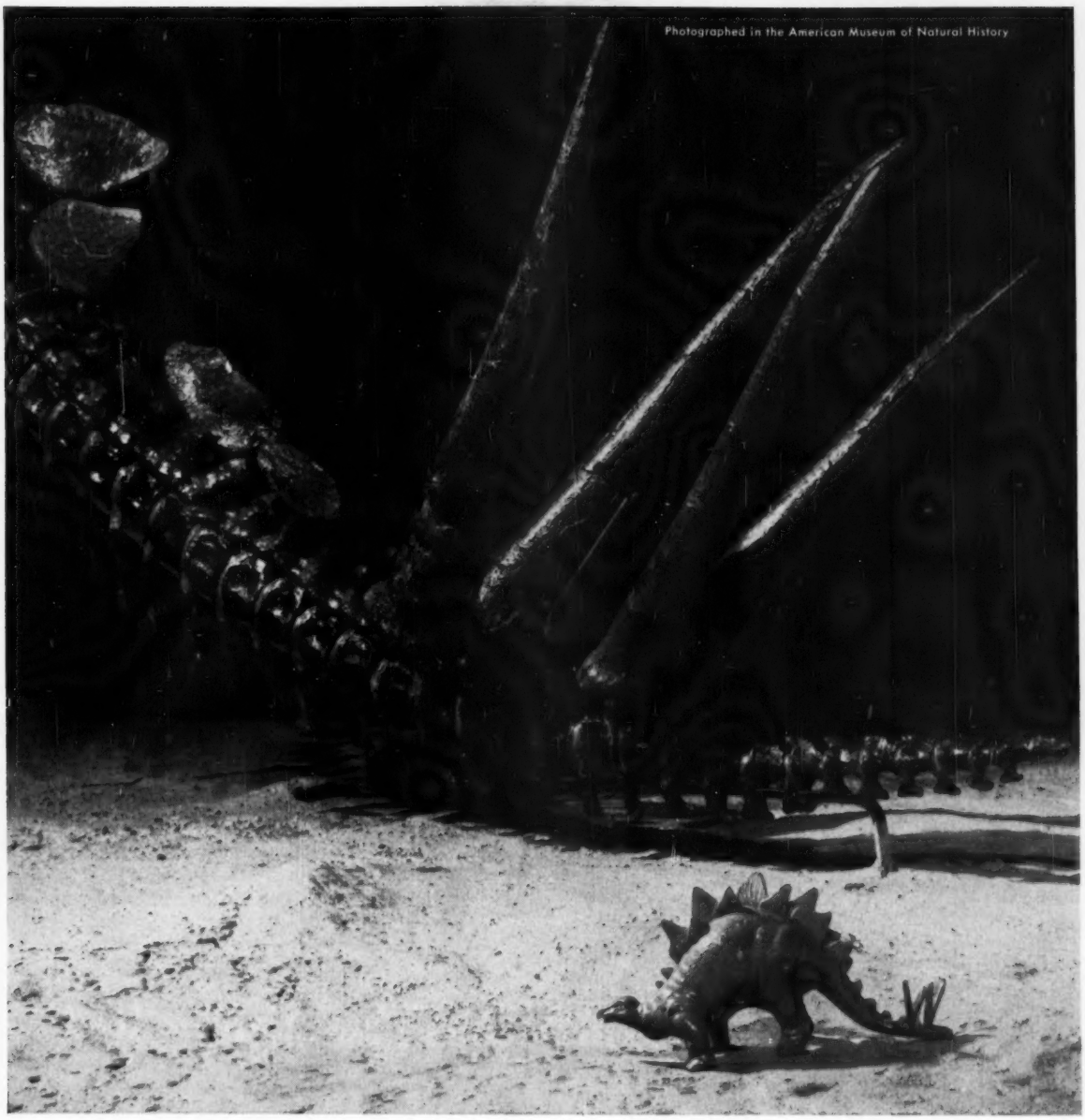
• **Melamine-Formaldehyde Resin:** Bulletin covers description and specifications of new resin, 3560-65 Super-Beckamine. Reichhold Chemicals (White Plains, N.Y.).

• **Salicylaldehyde:** New booklet lists properties, reactions, toxicological information. Data includes a bibliography, uses in perfumes, soaps, deodorants and analytical reagents. Dow Chemical Co. (Midland, Mich.).

• **Plasticizers:** Booklet depicts versatility of solid plasticizers, gives details on uses in adhesives, lacquers, foams, films and rigid plastic compositions. Specifications are given for obtaining hard, tough compositions at ordinary use temperatures. Monsanto Chemical Co. (St. Louis).

• **Uranium:** New catalog lists research reports and documents available from the Army, Navy, Air Force, Atomic Energy Commission. Includes confiscated German material on uranium. Office of Technical Services, U.S. Dept. of Commerce (Washington 25, D.C.).

• **Waxes:** Specifications, properties, characteristics, compatibility and uses of PE Tetrastearate, hard, high-melting domestic wax, are covered in new data sheet. Applications and ad-



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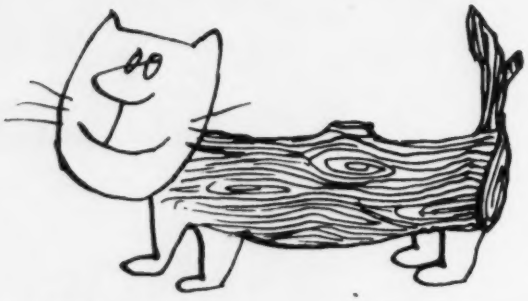

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vantages in polishes, coatings and textile finishing also discussed. Hercules Powder Co. (Wilmington, Del.).

• **Isotopes:** 24-page catalog indexes all available compounds of isotopic forms, includes information covering activity, packaging and prices. Approximately 400 radioactive compounds of carbon-14, phosphorus-32, sulfur-35; and 150 stable isotopic materials of deuterium, nitrogen-15 and oxygen-18 are included in the listings. Volk Radio-Chemical Co. (5412 North Clark St., Chicago 40, Ill.).

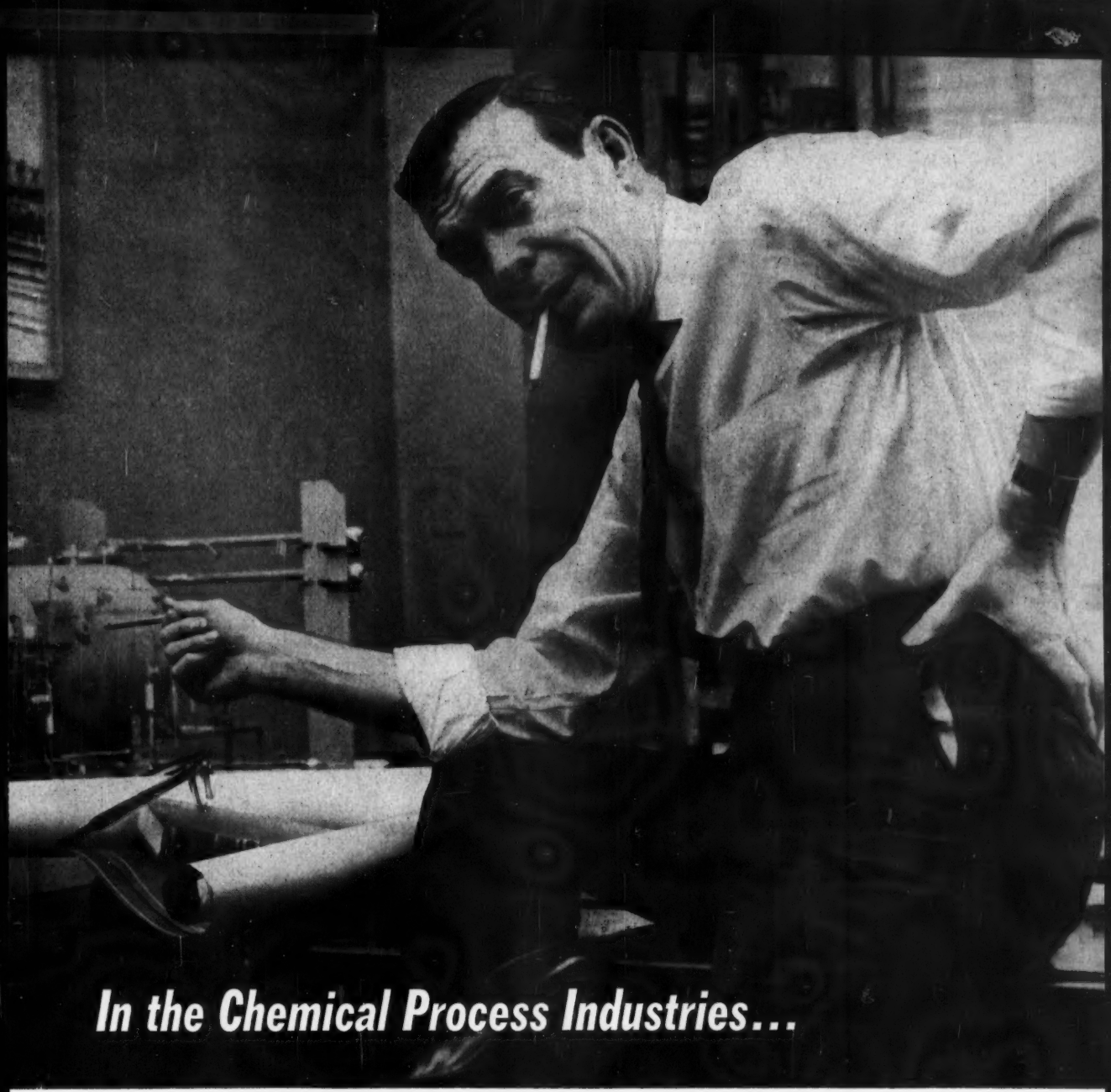
• **Surface-Active Agents:** A new 24-page catalog lists products by trade names, gives active ingredients, percent activity, physical state, general use, specific applications and properties. Two-page section explains chemistry of products under anionic, cationic and nonionic classifications. Onyx Oil & Chemical Co. (Jersey City, N.J.).

• **Fluorescent Pigments:** Various uses of pigments are described in four-page folder. Applications are covered in plastics, rubber, printing, paper, textiles and paints. A total of 15 fluorescent and seven phosphorescent pigments are listed with a section on technical data. United States Radium Corp. (Morristown, N.J.).

• **Polyethylene Resins:** 22-page brochure gives detailed information on uses of Epolene C and Epolene N. Epolene C is suggested for use in molten paper coatings, paraffin upgrading. Data covers techniques for application, use of modified coating equipment, molding operations. Epolene N is suggested as a modifier in wax blends for paper coatings and carbon papers. Also included: viscosity data and cloud paint graphs and tables. Eastman Chemical Products, Inc. (New York).

• **Isopropylamine:** 15-page safety data sheet covers properties and information essential for safe handling of the chemical. Manufacturing Chemists' Assn. (Washington 9, D.C.).

• **Chloroformate-Monoxide:** Bulletin explains properties of three new chloroformates: isopropyl, glycol bis-, diglycol bis-; and butadiene monoxide, also new. It lists reactions with alcohol, glycols, amines and diamines to produce organic carbonates, polycarbonates, carbamates and polycarbamates. Columbia-Southern Chemical Corp. (Pittsburgh, Pa.).



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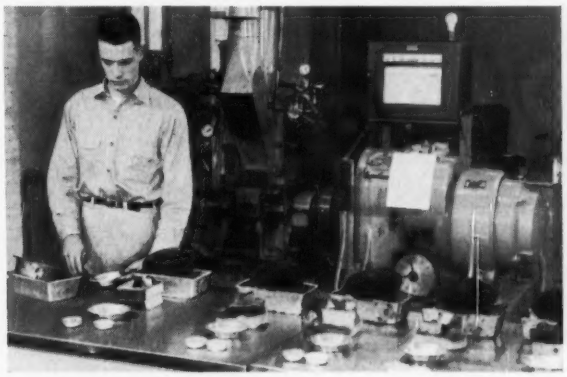
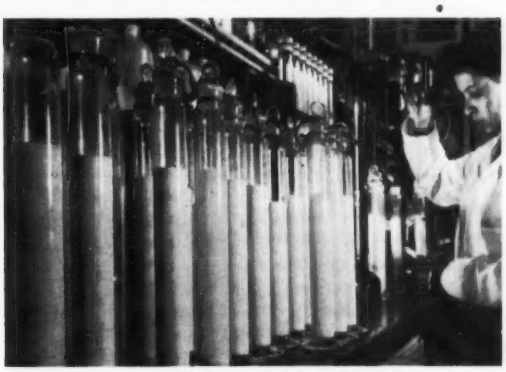


Uniform quality of carbon blacks is vitally important in the rubber industry. Here, test samples are being prepared in the Witco-Continental Akron laboratory.



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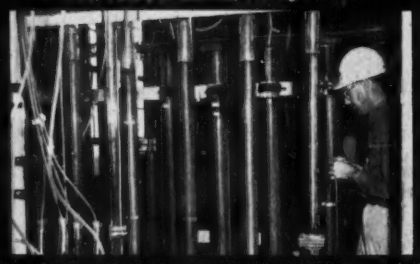

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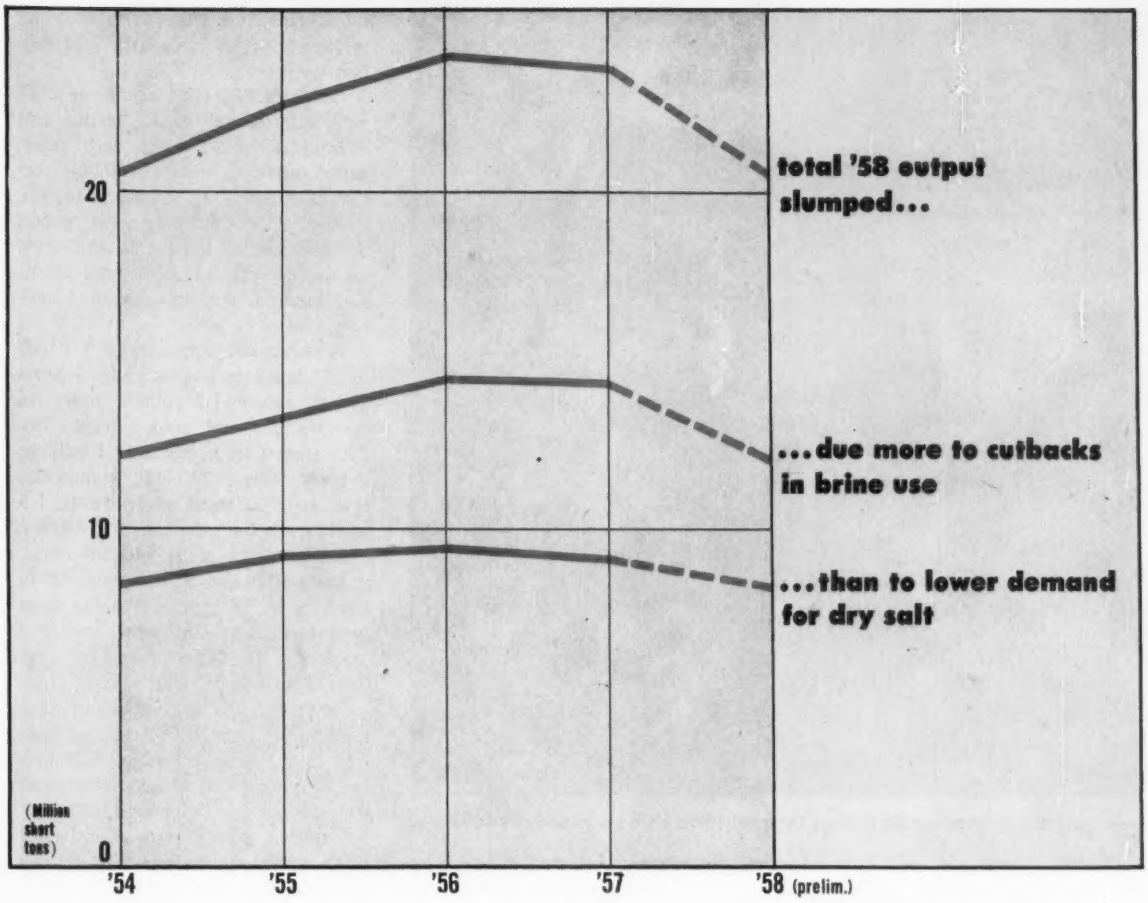
Recession-Hit U.S. Salt Production



Salt Setback: No Brake on Expansion

U.S. salt producers last year, hit by the '58 recession, shook 20.6 million tons of salt out of the nation's reserves —14% less than they did in '57. Nonetheless, last fortnight, Morton Salt opened the first new U.S. salt mine in 25 years. It showed clearly that this sudden decline, the first major interruption of salt's previous steady growth, caused relatively little worry among producers.

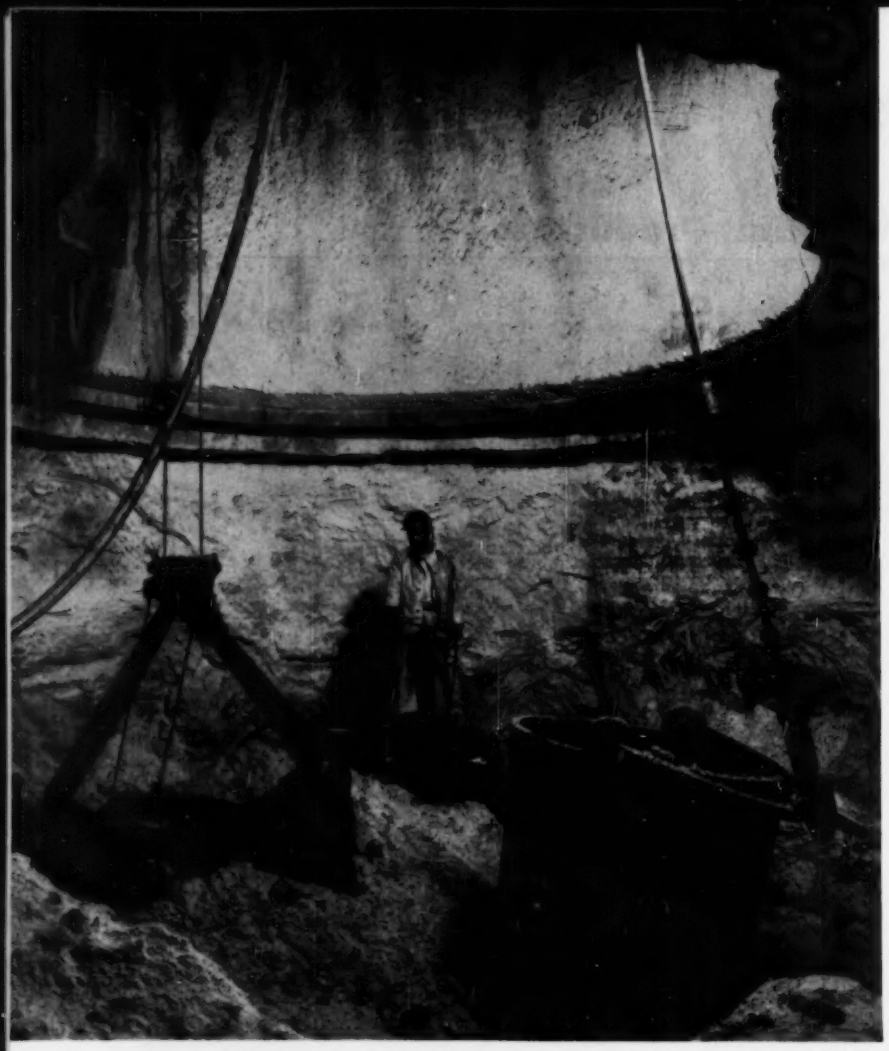
They are convinced that there will be a resurging demand for this historically important chemical and dietary staple, which, in technologically advanced nations, now finds its biggest markets in the chemical process industries.

It has been the CPI's needs—for production of chlorine, soda ash, caustic, etc.—that have forced most of the expansion of salt output in recent years. But Morton's $6-million Fairport mine, near Painesville, O., marks a change because most other output increases have come from brine-process expansions. It won't be the only new mine for long, however; International Salt is putting down a similar mine on Whiskey Island, near Cleveland, at the mouth of the Cuyahoga River.

Morton's mine taps a mammoth storehouse of rock salt that extends from under Lake Erie southward to West Virginia. The total estimated reserves: 200 million tons. Mine operations will be stepped up to present potential of 300 tons/hour by next fall, but ultimately the mine is expected to produce at a 500 tons/-hour clip.*

Salt Soars, Then Slumps: During the past half-century of technological advancement, U.S. salt consumption has kept pace and swelled to impressive proportions; it hit a high of 24 million short tons in '56. Obviously, in a market of this size, even moderate percentage sales declines represent huge tonnage drops. For example, an approximately 1.5% decline in the amount of salt sold or used in the U.S. in '57, compared with

*Last December, former Ohio Governor C. William O'Neill approved a 50-year lease on the underground salt bed area; Morton Salt will pay the state $10,000/year plus 5¢/ton royalty, based on anticipated production of 1 million tons/year.



New Salt Mine: Morton Salt digs into mammoth new reserves in Ohio.

'56, represented roughly a 363,000-ton cut in consumption. The 14% decline in '58, compared with '57, equates to a cutback of about 3.2 million tons of salt.

Total U.S. salt production in '58, according to preliminary estimates by the U.S. Bureau of Mines, was almost 20.62 million tons, worth about $138.7 million. Incidentally, although total tonnage production declined 14%, value of the output dropped off only 7%.

U.S. imports of salt (based on data for the first 11 months) amounted to an estimated 539,000 tons, valued at $2.9 million. That tonnage was 18% less than was imported in '57. U.S. salt exports also dropped off in '58—by about 7%, to 363,000 tons, worth about $2.27 million.

The drop of U.S. salt imports in '58 was in marked contrast with the 78% increase scored in '57 over '56, which had followed another substantial hike of salt imports in '56. The additional quantities of imported salt came mainly from the Bahamas, Canada and Mexico.

Magnesium Major Cause: The big '58 salt production slump is attributed mainly to cutbacks in use of salt in brine, largely because of curtailed magnesium production in Texas. There were, of course, other contributing factors, e.g., recession-caused slowdowns in many major salt-consuming industries such as manufacture of chlorine and soda ash (*CW, March 7, p. 113*).

A detailed end-use breakdown of '58 salt consumption isn't yet available; but '57 statistics delineate industry patterns well—perhaps show more realistically "normal" supply/-demand relationships than would the recession-distorted situation in '58.

U.S. chlorine production in '57 consumed more salt than any other single use, as it did in several preceding years. Second largest consuming industry was manufacture of soda ash, which previously was the chief industrial outlet for salt. The '57 requirements: for chlorine, almost 8.7 million tons; for soda ash, 7.22 million tons.

Other CPI salt needs in '57 included (short tons): textile and dyeing, 199,000; soap and detergents, 42,000; metals, 150,000; ceramics (including glass), 18,000; rubber, 209,000; pulp and paper, 135,000; water softeners (and service companies), 383,000; other chemical manufacture, more than 1 million tons.

Nonchemical applications for salt in '57 lined up this way: food processing, almost 1.5 million tons; ice manufacture and cold storage, 79,-000; animal feeds, almost 1.1 million; grocery stores, 733,000; transportation, 107,000; local governments, 1.5 million; U.S. government, 40,000; miscellaneous outlets, 576,000 tons.

Brine Biggest: Salt consumed in the U.S. in '57 came essentially from three sources (not including imported material): dry salt produced by evaporation, brine, and rock salt.

Of the total 23.85 million tons used in '57, about 14.5 million tons was in the form of brine, 5.34 million was rock salt, 4 million tons was dry salt produced by evaporation.

Chlorine manufacture—the largest single outlet—maintained this general source relationship; of the total near-8.7 million tons salt used in '57, more than 6.73 million was in the form of brine, about 1.3 million was rock salt, a relatively small 648,000 tons was evaporated salt.

U.S. Salt Supremacy: The U.S. stands far above any other nation as a producer of salt; and this fact—in light of the relatively small net exports of salt—points strikingly to the nation's industrial dependence on salt.

Of the total 77.4 million tons of salt produced in the world in '57, about 26.4 million tons were produced in North America (including Central America and the West Indies); the major part—23.85 million tons—was produced in the U.S. Canada was the next largest salt producer in North America; it turned out 1.77 million tons in 57.

Total European salt production was greater than that of North America. Of the total 29.9 million tons,

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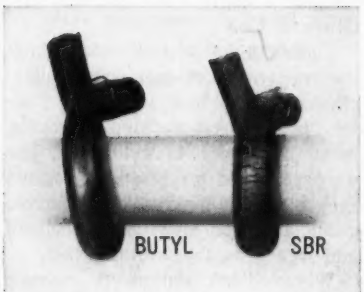

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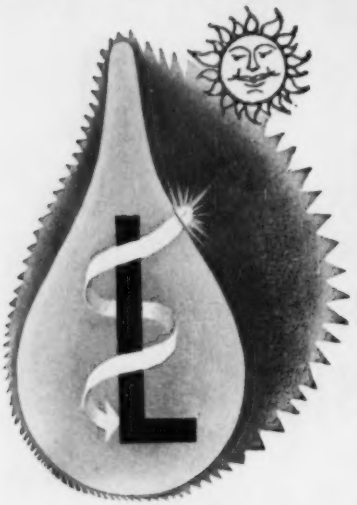

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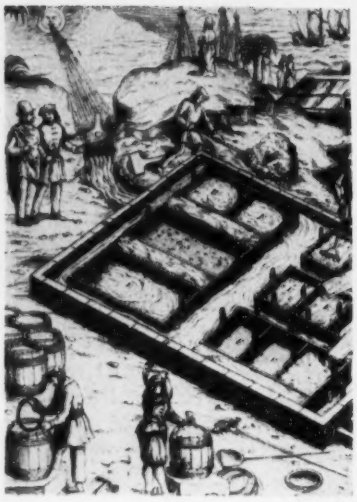
Salt: Ancient Chemical Commodity

The economic evolution of salt into its vital modern-day role as a basic industrial chemical has been marked, throughout history, by complex problems of production, distribution, and government controls.

In 18th century France, for example, the government enjoyed complete monopoly of salt production and sales. This frequently led royal officials into violent conflict with "private enterprise"—smugglers. And widespread ancient salt taxes—then often oppressive—have their modern counterparts, such as the financial arrangements between Morton Salt and the state of Ohio.

Salt today has an important role in international trade. In ancient times, salt was often the one vital commodity that made trade between two areas worthwhile. Case in point: trade between the Aegean and southern Russia, according to Herodotus, was largely dependent on the salt pans of the Dnieper.

Salt technology has come around part circle. Ancient salt production was based mainly on evaporation of



BETTMANN

sea water *(above*—illustration by the 16th century mineralogist Agricola). Underground mining of rock salt came into prominence considerably later. In the past few decades rock salt mines have been pushed into secondary importance as a source of salt because of emphasis on recovery from brine.

the U.S.S.R. supplied 7.2 million tons. Next largest European producers: United Kingdom, 5.57 million tons; West Germany, 4 million; France, 358 million tons. (In contrast to growing U.S. salt output, production in Russia has stayed at a 7.2-million-tons/year level since '53.)

Asiatic salt production climbed to 17.1 million tons in '57, China producing 8.8 million tons, India, 4 million tons. Total South American salt production was 1.9 million tons; about 1.64 million tons were made in Africa and 500,000 in Oceania.

The U.S. will undoubtedly continue to rank as the world's major producer—and user—of salt for a long time. Meanwhile, the nation's salt industry will continue to enjoy an enviable degree of economic security. There is, for example, no conceivable chance of reserve depletion. And the basic nature of salt—both as food and as industrial raw material—is so immense and varied that competitive problems are virtually nonexistent, and unsettling effects of even major business recessions are effectively cushioned.

High-Density Higher

U.S. demand for high-density polyethylene and its copolymers may soar from an estimated 50 million lbs. in '58 to a whopping 350-400 million lbs./year by '62, according to new industry estimates.

The optimistic forecast was made this week at the Boston meeting of the American Chemical Society by Elwyn Winne, vice-president of the Polymer Chemicals Division of W. R. Grace & Co.

There's a lot of talk today about the copolymers of high-density polyethylene, said Winne, because they offer "better stress-cracking resistance, better resistance to cold flow, less warpage, better processability because they are faster molding." But, he conceded, the copolymers are not as stiff and strong as the homopolymer.

Winne didn't venture to estimate the relative amounts of high-density homopolymer and copolymer that would constitute the total market estimated for '62. Whatever the ratio of the materials, this is how the probable end-use breakdown looks now:

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The meteoric rise of filter-tip cigarettes (from 9% of the market in 1954 to 45% in 1958) heralds another success story for versatile cellulose. Almost all cigarette filters use cellulose-based fibers in some form... in various degrees of fineness, packed tightly or loosely ... crimped, twisted or grooved in different ways.

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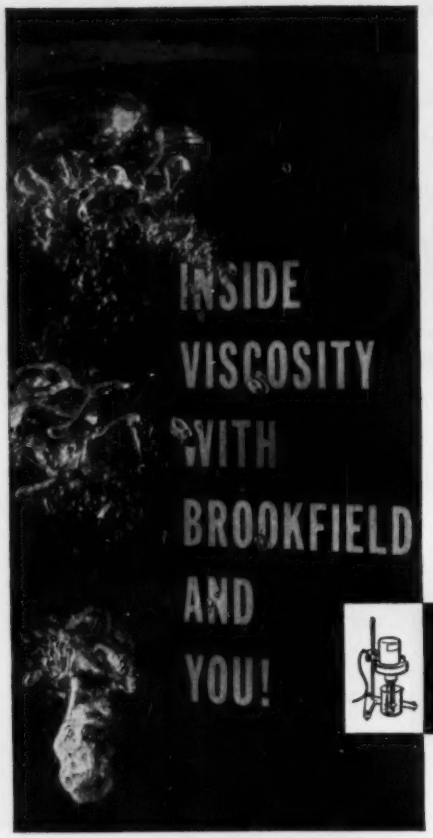

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High-density polyethylene, Winne noted, has been trying to get off the ground since '55, when production was still negligible. By '56, a "few million pounds were kicking around" and even in '57 "only a few million pounds were made and sold."

Last year was the first full commercial year when, according to Winne, sales exceeded the "first commercial year" mark of any other single chemical or plastic, 50 million lbs. —(Some market researchers, he said, have estimated '58 sales as high as 60-65 million lbs.)

The price history of high-density polyethylene helps explain the plastic's growth pattern. The product came on the market bearing a near-50¢/lb. price tag; but since early this year, it has been selling at 38¢/lb.

The price of high-density polyethylene is now only 3¢/lb. higher than low-density material, its "big brother, the billion-pound miracle child," says Winne. He believes this "will attract the interest of a wider number of fabricators who heretofore admired its qualities but not its price."

A number of new uses were foreseen "that will lick overcapacity and probably double our industry's sales of high-density in '59, and we hope double them again in '60." For example, high-density polyethylene is expected to take a large share of the 75-million-lbs. plastics housewares field. Other promising areas: infants' furniture, sports equipment, luggage, parts for home appliances, packaging.

But Winne also cautioned that "achievement of the foregoing market volume is predicated on several short-term process and product developments that will considerably widen the type of products made from so-called high-density plants.

"Probably, newcomers will enter the field with considerably more capacity. So, by the time the market level attains a theoretical level, an excess of capacity will exist, at least in part for the newcomers who may be way behind in the research and development race. In this frantic plastics race," he reminded, "you can't even look at a static set of conditions."

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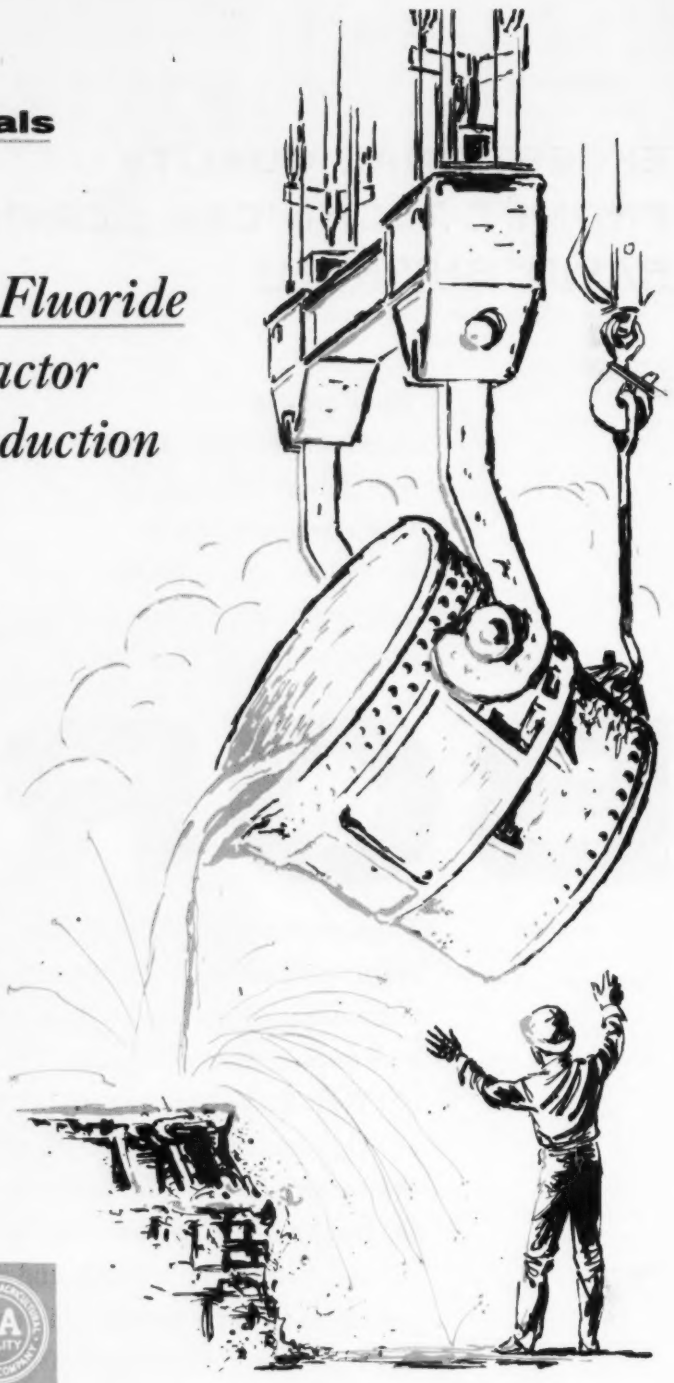

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Technology
Newsletter

CHEMICAL WEEK
April 11, 1959

There's no dearth of hopeful drugs for testing on cancer, according to reports from the American Cancer Society-sponsored meeting held in Excelsior Springs, Mo., last week. Thirty-seven new chemicals and about 50 hormones are currently being tried or are about to be tried on cancer patients. None is considered a cure for cancer, however, although some may help prolong the lives of cancer victims.

•

Highlights of this week's American Chemical Society meeting in Boston:

Du Pont researchers revealed tough films and strong fibers can be obtained by reacting diisocyanates with dioximes, dihydrazides and hydrazines. For example, the condensation of 4,4′-biphenylene diisocyanate with cyclohexanedionedioxime proceeds readily in dimethylformamide solution. The resulting polymer casts into a clear tough film.

A new anesthetic called methohexital, developed at Eli Lilly, couples high potency with a short time of action. It's a barbiturate given by injection, works fast; it has had two years of clinical trials on more than 10,000 patients.

Synthetic whiskey equal to the best now made is a possibility, chemical consultant Robert Carroll told the ACS's division of agricultural and food chemistry. Volatile components are being isolated using a vapor fractometer. Ultimately, pending further analytical work, the composition of quality beverages may be duplicated at a considerable saving in time and cost, since aging and storing could be eliminated, Carroll said.

•

Texaco is operating a polymerization unit via computer. The unit at its Port Arthur, Tex., refinery polymerizes about 15 million cu.ft./day of refinery gas into more than 1,800 bbls. of blending stock for high-test gasoline. The operation is completely computer-controlled by a Thompson Ramo Wooldridge RW-300 that evaluates such process variables as input gas analyses, pressures, temperatures and flow rates. The computer automatically resets plant controls every five minutes, sounds an alarm in the event of abnormal operation or failure.

Texaco President James Foley reports that by providing more efficient use of catalyst materials alone the system is expected to save $75,000/year. In addition, it may increase over-all efficiency by 6-10%. This initial installation will also provide valuable operating experience and know-how for future computer installations.

•

Collaboration in developing synthetic penicillins is planned by Bristol Laboratories, Inc. (Syracuse, N.Y.), and Beecham Group Ltd. (London, England). They've signed an agreement to work together in the field—one in which recent Beecham research (*CW Technology Newsletter, March 14*) has found commercial possibilities.

Technology
Newsletter

(Continued)

A new tuberculosis vaccine looks promising in animal tests, medical scientists at the University of California Medical School (Los Angeles) report. It is made from TB germs treated with radioactive cobalt radiation to inactivate the germs. The new vaccine offers protection in mice and guinea pigs comparable to BCG vaccine, which contains modified living TB bacteria. BCG is used in several countries but has not been accepted in the U.S. because its live germs are considered a clinical threat.

•

The illusion that "foreign research can be bought by the yard" is creating mistrust and bitterness abroad, an American Management Assn. forum in New York was told last week. Linde Moser, foreign technical representative for International Minerals & Chemical Corp., warned that the spurt in research activity by U.S. firms operating abroad (*CW, March 28, p. 43*) is resulting, in some cases, in inept handling of cantacts with European scientists. Both parties benefit, Miss Moser points out, when the approach is based on "proper discretion and dignity."

•

A new nonferrous alloy of improved corrosion resistance has been developed by Union Carbide Metals Co. Carbide hasn't yet released details, but it has discussed its potential with some other producers and equipment fabricators. Carbide lists tantalum and columbium among its nonferrous products, but it has considerable investment tied up in titanium, which would seem the likeliest area for alloy development.

•

A new high-temperature thermoelectric material for converting heat directly into electricity has been developed by Westinghouse Electric Corp. Research Laboratories (Pittsburgh). It's an indium arsenide phosphide semiconductor made by chemically combining high-purity indium, arsenic and phosporous. Operating temperature range: 850-1500 F.

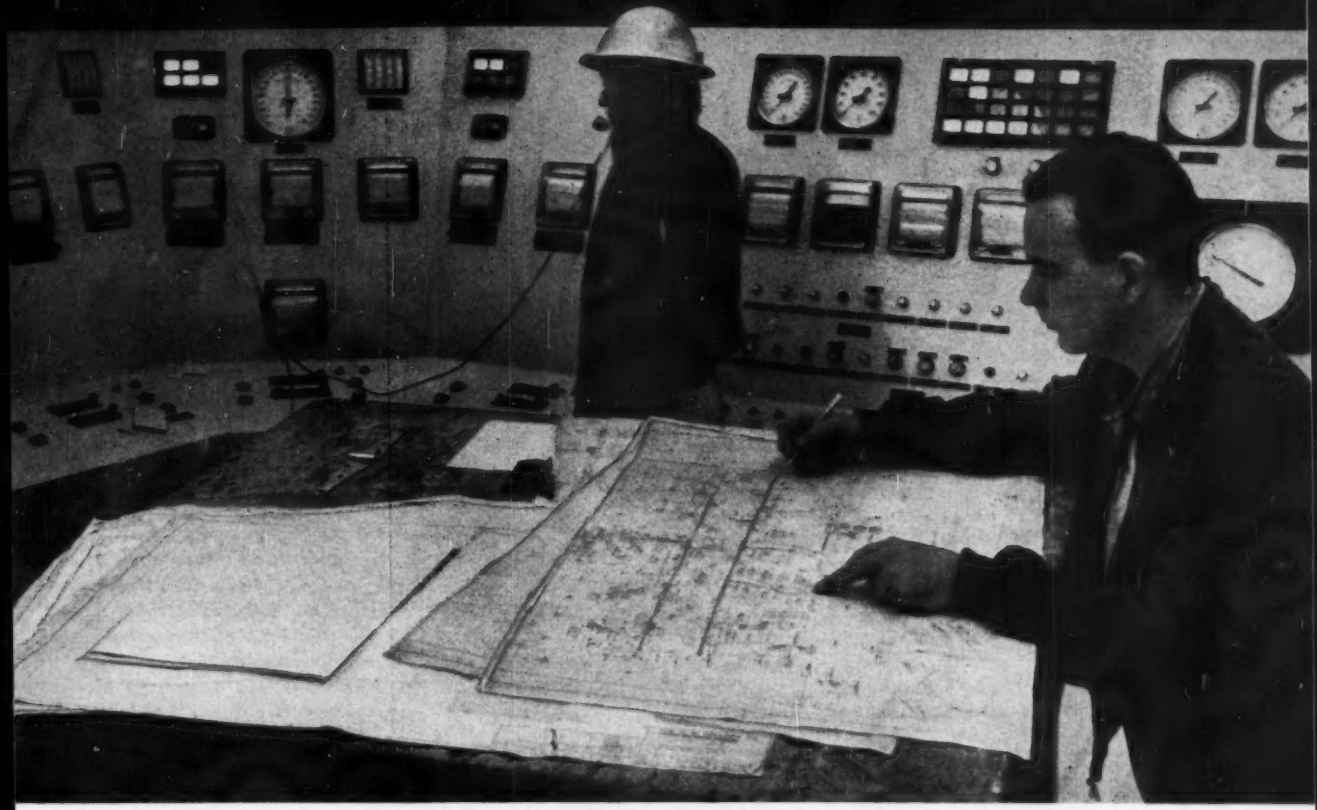
Westinghouse research physicist Raymond Bowers, who conceived and developed the new material, reports that it will fill the gap between the thermoelectric materials now available. The indium arsenide phosphide is expected to find immediate use in devices operating at temperatures well above those now considered practical, but below the extremely high-temperature range (2000-3000 F) where Westinghouse's ceramic-like mixed-valence compounds (*CW, Sept. 13, '58, p. 82*) take over.

•

Japan's first uranium processing plant is now producing reactor-grade uranium tetrafluoride and vacuum recast metal from ore concentrates. The plant was designed for Atomic Fuel Corp. of Tokyo by Weinrich & Associates (Washington, D.C.). It employs the first commercial installations of the Higgins-type, moving-bed, ion-exchange column and of the electrolytic uranium reduction cell. The tetrafluoride is produced by the Excer process (*CW Technology Newsletter, Oct. 20, '56*).

KELLOGG CHECKS OUT

ANOTHER POLYETHYLENE PLANT FOR U.S.I.



Kellogg engineers make a final instrumentation checkout in the utility main control station at U.S.I.'s new Houston plant. If you are interested in the instrumentation phases of Kellogg's complete engineering, procurement, and construction services, send for 12-page Kelloggram, *"The Application of Innovation in Engineering Systems"*.

New 75-million-pound plant is fourth of five Kellogg polyethylene projects for U.S.I.

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Recently Kellogg completed a polyethylene compounding plant for U.S.I. at its Tuscola complex. Currently Kellogg is working with U.S.I. on plans *now* to double the output of the new polyethylene plant in Houston.

The early and successful completion of Houston at its present 75-million-pound capacity reaffirms U.S.I.'s confidence in Kellogg plant engineering and construction, and is another example of this contracting organization's ability to work harmoniously with engineers of leading chemical companies.

If *you* are contemplating new facilities for the production of plastics, petrochemicals, or other chemical materials, The M. W. Kellogg Company welcomes the opportunity to discuss its world-wide engineering, procurement, and construction experience with you in detail.

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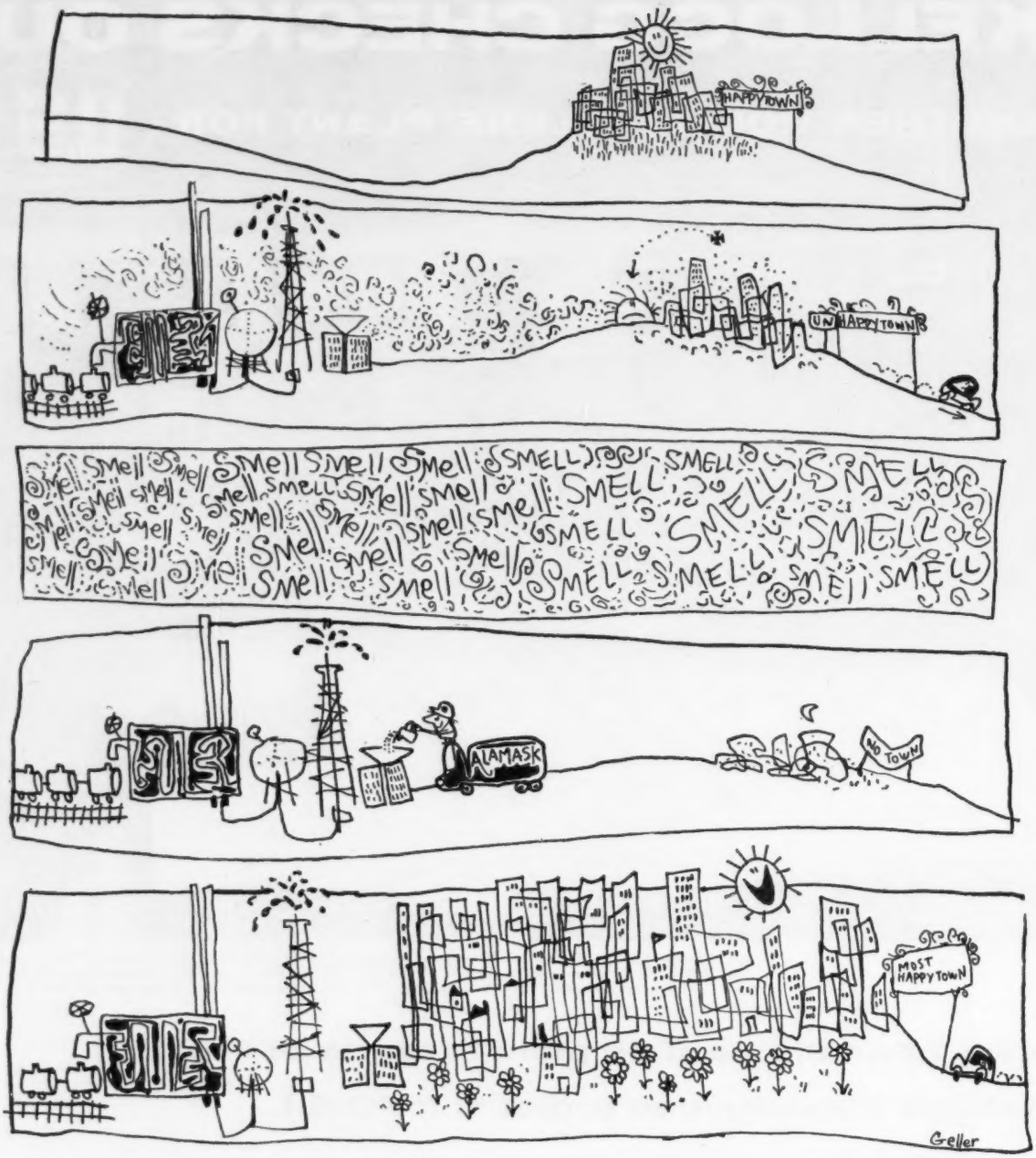

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IRWIN GALLOWAY

New, ultraviolet-resistant clear polyethylene film may soon vie with glass in covering greenhouses.

Helping Polyethylene Stave Off the Sun

This week, American Cyanamid is rushing development of an ultraviolet absorbing chemical that's figured to have a sales potential of more than $1 million/year. The compound helps polyethylene resist degradation by sunlight—a plus value that should help the film find wider use in packaging and agriculture.

The newcomer, chemically 2,2'-dihydroxy-4-octoxybenzophenone, was synthesized at Cyanamid's Bound Brook, N.J., research laboratories, and is the outstanding member of a series of similar compounds—differing only in the alkoxy group—that were synthesized and screened by the firm as ultraviolet antagonists in polyethylene.

Although there has been much research in ultraviolet absorbers for plastics (*CW, May 4, '57, p. 40*)—not only by Cyanamid but also by such other companies as General Aniline & Film (Antara Chemicals), Monsanto and Harshaw — the field has shown gradual rather than dramatic progress.

One reason is the fairly high cost of commercial compounds (around $5-9/lb.). Another had been the lack of a suitable absorber for polyethylene—a large-volume plastic having a critical need for ultraviolet resistance in transparent film form.* Arndt Weicksel, Cyanamid's product supervisor for the absorbers, asked polyethylene producers what kind of an increase in film sales could be expected if film could be made light-stable. The range of increase was 10-50%, mostly in markets the film does not now have. In '58, about 236 million lbs. of film were produced out of a total of around 830 million lbs. of the resin. Considering that about 0.1-0.2% of the new absorber is used to impart ultraviolet resistance (although as much as 0.5% may be required in special cases), a 200,000-lbs./year market for the compound is conceivable. Its probable cost: $5-7/lb., $12/lb. at the outside. But this depends on production scale-ups that are still in the future.

Weicksel hopes to have developmental quantities available for prospective users "in a couple of months." In perhaps six months, as the result of broad testing and more knowledge about producing the compound, it will be possible to make a better estimate of the market.

One major area in which the improved film may find favor is as a substitute for glass in greenhouses. While this application has had heavy promotion by film producers such as Spencer and Union Carbide's Bakelite Division, it hasn't met with the success anticipated, largely because the untreated film becomes brittle and breaks as a result of weathering. Even in temperate climates, clear polyethylene can be used outdoors for only one season. A useful life of two or more seasons may be possible with the protected film, Cyanamid believes. Its conviction is backed by tests.

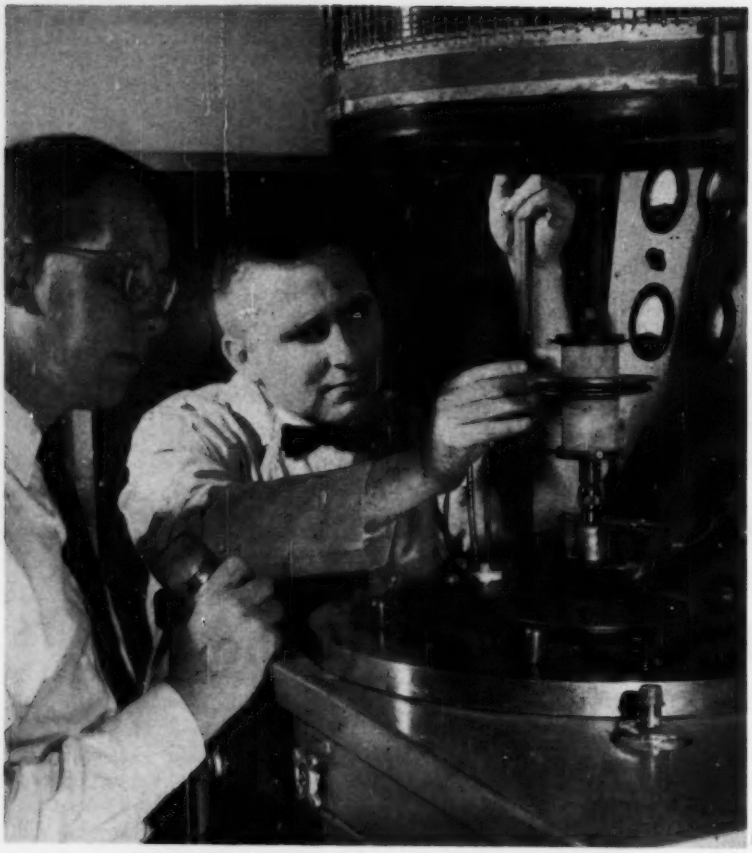
There's a chance that the modified film may not pass enough ultraviolet light for plant growth, though, and this will get further study.

Packaging for colored clothing is another promising application.

The treated film not only resists sunlight but also screens out ultraviolet rays that harm colorants. Since the wave lengths that destroy colorants vary appreciably from one colorant to another, it is not practical to incorporate absorbers in the dyes and pigments themselves.

Lively competition is brewing among films for outdoor use. Du Pont, for example, has begun semiworks production of Type R polyvinyl fluoride film that's said to feature outstanding weathering characteristics. Other uv. absorbers are coming along, too. Geigy Co. (Rhodes, Middleton, Manchester, England) has reported its new Tinuvin-P "improves the color" of some polyethylene grades. But Cyanamid is optimistic, and is backing its optimism with more research.

*Carbon black renders polyethylene ultraviolet-resistant, but also makes it opaque.



Bell's Benson lowers bell jar over sample mounted for floating-zone refining experiment, as colleague Pfann, holding 2-in. tubular sample, closely observe.

Gain for Zone Refining

While the floating-zone method of purifying metals is invaluable for making high-quality transistors and other electronic components (CW, Aug. 24, '57 p. 51), it is limited as a production tool. Researchers at two laboratories have been whittling away this limitation, opening the way to lower-cost, high-purity silicon, etc., and the fruits of their research are now emerging.

At the recent American Physical Society meeting in Cambridge, Mass. (*CW Technology Newsletter, April 4*), Bell Telephone Laboratories (New York) researchers W. G. Pfann, K. E. Benson and D. W. Hagelgarger revealed what Bell calls "a striking improvement in the floating-zone refining technique, substantially increasing the volume of material that can be purified."

And next month, at a meeting of the Electrochemical Society in Philadelphia, Sylvania staffers will disclose a different method of accomplishing the same result.

In conventional floating-zone refining, a heat source melts a "zone" on a vertical rod of the material to be purified. This zone is made to move along the rod, and impurities in the molten material accumulate at one end. Ultimately, that end of the rod is cut off.

The molten zone is held to the rod by its own surface tension. This imposes a limitation on the amount of material that can be purified because there is a maximum height at which the molten zone can be supported by surface tension. Small-diameter rods melt through easily without exceeding this height. But before large-diameter rods melt through, the height at which surface tension can support the molten metal is exceeded.

Bell overcomes this problem by using specially shaped cross sections of material to be purified. These may be flat plates or tubes, which melt through without exceeding the maximum height.

Although a 1-in.-diameter iron rod ordinarily can't be refined by the floating-zone method, a 2-in.-diameter, ⅛-in.-wall tube of the same material—which has the same area of cross section—is easily handled.

The new method also applies to treatment of sheets a few mils thick. And it works on tin, gold, lead and bismuth as well as on silicon and iron.

The method, discovered by Bell's H. C. Theuerer, is expected to permit increases in cross-sectional areas at least five to 10 times those currently used. It is also expected to make floating-zone refining applicable to materials for which the conventional method is not practical. And it's also possibly a method of refining reactive metals.

K. M. Arnold, B. W. Levinger and H. F. Matare of Sylvania research laboratories (Bayside, L.I., N.Y.) are attacking the problem of increasing the maximum diameter of a semiconductor rod that may be purified by applying electromagnetic forces to hold the molten zone together. A two-coil, two-frequency system is used. Silicon rod up to 1 in. in diameter has been zone-refined and converted into single crystals.

Westinghouse (Pittsburgh), another prominent research lab engaged in zone refining research, hasn't come up with any similar modification in floating-zone refining. Westinghouse is concentrating on improvements in other directions. Its so-called cage-zone refining technique, currently under study, has as its main objective the purifying of metals so reactive that they become contaminated with crucible materials. Using titanium or columbium bars having a square cross-section, Westinghouse has been able to contain the molten zone in a crucible (cage) of the metal itself. The corners dissipate heat more rapidly than the core of the bar, remain solid while the core is molten.

All this activity in improving the zone-melting approach to refining metals is expected to have long-term

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There's a bright new shield you can use to fend off corrosion, the hidden profit-destroyer.

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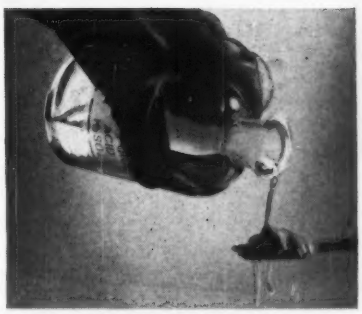

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Moscow Beachhead

This week, Rand Development Corp. (Cleveland) is getting a close view of Russian technological progress from its new office in Moscow (CW Technology Newsletter, April 4).

In plush, staid Sovietskaya Hotel, on the outskirts of the metropolitan area, Rand's small staff of English-speaking Russians mentored by a Russian-speaking American is pioneering a venture that could prove lucrative.

Negotiations on specific projects between the patent-holding company and the Russians are confidential. But James Rand, the firm's president, is particularly interested in Soviet achievements in chemistry, physics, medicine, communications, geology and documentation. Rand reports he is specifically investigating these Russian devices utilizing semiconductors —a noiseless refrigerator, a constant-temperature container for transporting bull sperm on collective farms. He is also looking at "electric sleep" machines, which induce normal sleep without narcotics, and an information translation and reading machine said to be capable of storing the world's annual outpouring of a half-million technical documents.

Rand is also impressed with Soviet cancer research. He has arranged for two Russian scientists to come to Cleveland this summer to work in his firm's laboratories on electron microscopy of viruslike particles extracted from human cancer. Some Russians feel cancer is caused by a virus, and that vaccines may ultimately be found to combat the disease.

However, Rand isn't interested exclusively in appraising Russian technology. His company is also acting as advisor to the U.S. cultural and industrial exhibit, which will open in Sokolniki Park (Moscow) on July 4. The exhibit will be open for six weeks. Two Rand representatives working on the exhibit will be based at the Sovietskaya office.

Manuscript Writing Speedup

Kathryn Beck, secretary at Pfizer's Groton, Conn., laboratory, turns out research reports and papers three to four times faster than formerly, due to this new Remington Rand electric typewriter, equipped with interchangeable type faces. Chemical structures, previously drawn by hand, are typed. Three special keys are used—one that prints a diagonal line slanting upward, one with a diagonal line slanting downward, and one with a vertical line — all in conjunction with the standard horizontal "underline" key. Type faces can be changed in seconds by the typist.

Room for Plastics Growth

Pittsburgh's Penn-Sheraton Hotel this week was the scene of a free-wheeling discussion of construction materials of the future. Sponsored by the Building Research Institute, the Penn-Sheraton session highlighted the pre-eminence of plastics and metals in tomorrow's big buildings. The premium will be on light weight.

Clues to CPI opportunities in this field were sprinkled through the speculations of participating chemical research executives.

Paul Bachman, Koppers' vice-president for research and development, said, "New interest in suspension techniques of construction offer an opportunity for large-scale use of laminated films and foam panels as structural members." But Bachman sees room for improvement in present test samples of these plastic structural materials.

He also points out that conductive panels for heating may eliminate conventional heating systems, aid in efforts to lighten buildings.

J. B. Austin, administrative vice-president, research and technology for U.S. Steel, notes that steelmakers "are seeking new alloys with high corrosion resistance, hope to make thin sheeting available for facing modern buildings." He says that plastic-coated steel may soon offer competition to porcelain-surfaced steel for both indoor and outdoor use.

Aluminum makers are striving to improve the insulation value of their product. E. C. Hartman, assistant director of research at Alcoa, thinks aluminum laminates (plastic foam sandwiched between two sheets of aluminum) may turn the trick. Aluminum alloys (e.g., containing magnesium silicide) are being researched, too, in an attempt to add structural strength to the panels.

More use of glass and plastics is in the offing, too, as a consequence of the trend to more use of natural light and outdoor living. In this regard, researchers are now seeking better uv. absorbers *(see p. 87)*. Other targets: better transparency, insulating characteristics, soundproofing.

G. A. Webb of the Mellon Institute, moderator of the panel, told *CW*, "I think plastics will be the big thing—once the cost differential is closed by rising building costs, lower plastics prices. It's just a matter of time and economics."

But today's prophecies are a long way from tomorrow's building materials market. A lot more research and selling, will be needed to span the gap.

APPARATUS

Fume Hood: A new electronically operated fume hood has been developed by Duralab Equipment Corp. (Brooklyn, N.Y.).

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Contaminant Detector: An electrical resistance "probe," which will measure hard-to-detect liquid and gaseous contaminants, is available from Crest Instrument Co., division of Magna Products, Inc. (Santa Fe Springs, Calif.). The company reports that the device can detect extremely slight changes in humidity, ozone concentration, water content in a nonaqueous liquid, or other environmental conditions that have a tendency to attack metal.

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Environmental Test Chambers: New test chambers now on the market include:

- Scientific Engineering Laboratory's (Berkeley, Calif.) altitude chamber, which will simulate conditions up to 100 miles in altitude. It's 8 ft. in diameter, 15 ft. long, will handle large components.
- Development Engineering Co.'s (Norwalk, Conn.) Hot-Cold Humidity Chamber, which uses dry ice as a refrigerant. Temperature can be varied from —90 F to 425 F. Humidity can be varied from 20-95%.

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Recording Balance: The latest entry of Wm. Ainsworth & Sons, Inc. (Denver) is an electronic instrument which automatically prints the weight of samples placed on an analytical balance. The firm sells the entire unit consisting of an analytical balance, the electronic unit and an eight-place printing-adding machine. It covers the range from 200 gms. to 0.0001 gms. The balance and adding machine may be used independently.

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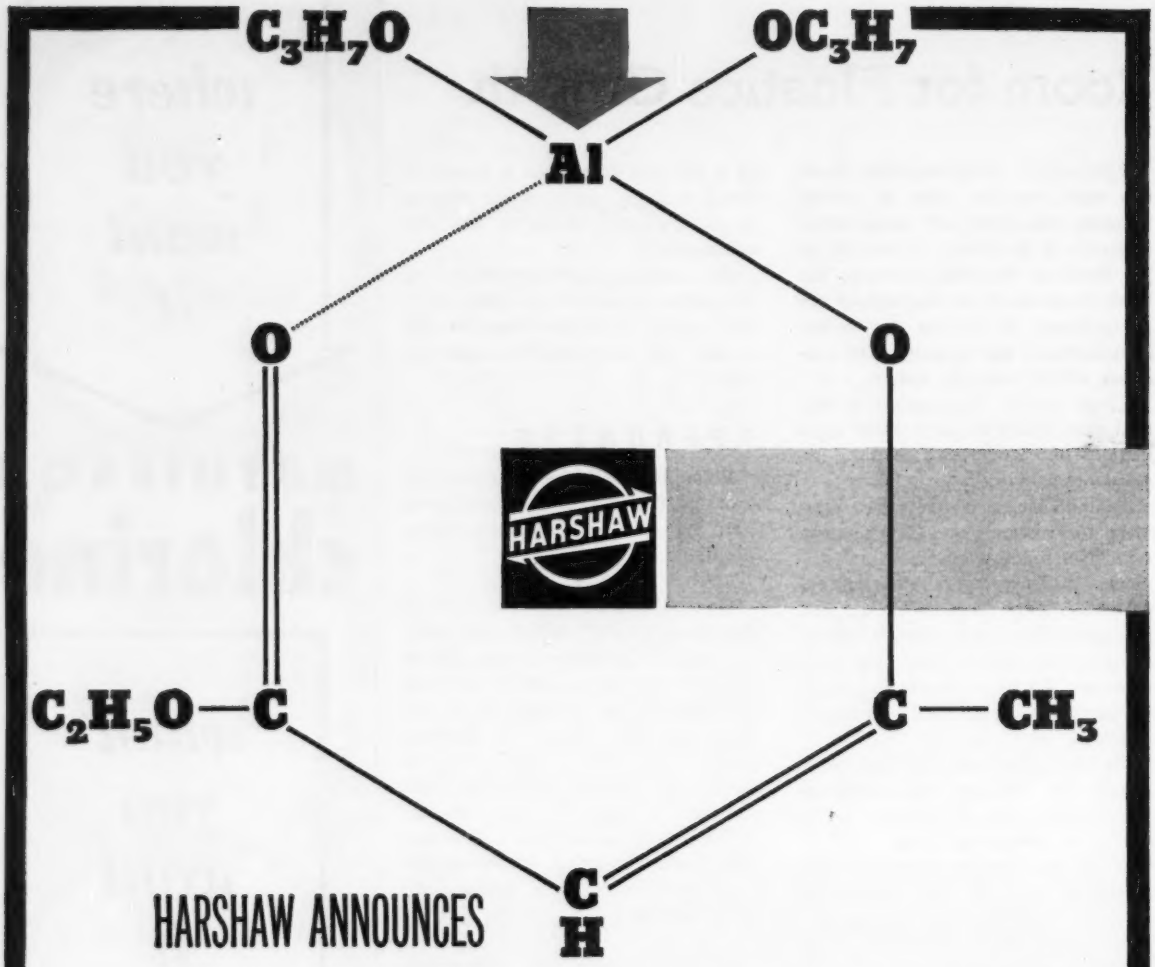

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Market Newsletter

CHEMICAL WEEK
April 11, 1959

A weakening of lead markets; quick shading of lead chemical tabs. That was the story last week. U.S. lead producers and refiners spurred the moves by cutting metal prices by ½¢, to 11¢/lb. Blamed for the cuts are overproduction, slow demand and uncertainty about U.S. import quota policies.

Lead and zinc import quotas established last fall temporarily helped stabilize the market, but gains in late '58 reportedly have been canceled out this year. In response to industry complaints, Congress is considering legislation to tighten quotas, help raise domestic prices to 15½¢/lb. for lead, 13½¢/lb. for zinc. World lead and zinc markets will also get an airing at a United Nations conference later this month; the U.S. is pressing for voluntary production cutbacks by producing countries, while foreign producers want U.S. quotas ended.

First lead chemicals to reflect lower metal prices were the oxides, which were reduced ½¢/lb. Typical listings (in carload lots, cost/pound): 95% dry red lead, 13.25¢ (97% and 98% materials, respectively, 13.45¢ and 13.60¢); litharge, 12.75¢/lb.

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Price of lysine monohydrochloride was slashed 25% last week in almost simultaneous moves by two producers—Merck & Co., and General Mills. The cuts bring tabs down to $6/lb. from previous $8.

Both producers say the lower prices reflect improved processes and the belief that markets can be broadened faster because of the reduction. And there's a hint of further reductions to come; a spokesman for General Mills tells *CW* that "while Merck led this shift, the next may well come from GM or another producer."

The chemical—an amino acid—is used as a nutritional supplement in foods, pharmaceutical products, vitamin formulations.

•

Price cuts on sodium hydride are posted by Callery Chemical. New listings for the highly reactive condensing and reducing agent: 1,000 lbs. or more, 95¢/lb.; 100-999-lb. lots, $1.20/lb.; 50-99-lb. lots, $1.70/lb.; less than 50 lbs., $2.20/lb. All prices f.o.b. Lawrence, Kan.

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Expected cutback of lithium production (*CW Market Newsletter, Nov. 8, '58*) at Foote Mineral's plant at Kings Mountain, N.C., has been forced by expiration of the firm's contract with the U.S. Atomic Energy Commission. The plant is the nation's largest producer of lithium-containing spodumene ore.

But Plant Manager Neil Johnson is optimistic; he told *CW* the slowdown (which necessitated layoff of about 80 employees) is probably only temporary. "Our predictions on market demand of lithium chemicals

assure us that lithium's long-term outlook is very bright," he said. "There will be substantial growth in the civilian use of lithium ore, and our mining operations will again operate at capacity."

•

A new, $150,000 sulfur recovery plant has been put into operation at Sun Oil's Toledo, O., refinery to help reduce air pollution. The new equipment converts hydrogen sulfide gas—produced in refining processes—into sulfur dioxide, which is then changed to elemental sulfur by use of bauxite catalyst. Capacity of the unit: 12½ long tons/day of sulfur.

•

A new GRS synthetic-rubber production line capable of turning out about 6 million lbs./month of product—is now in operation at Copolymer Rubber & Chemical's plant at Baton Rouge, La. This brings the firm's total synthetic rubber potential at the plant—formerly government-owned—to approximately 18 million lbs. gross/month.

Company spokesmen say the new line will run at 80% capacity through April, will reach full output by next month; first rubber product coming off the line is described as a "nonstaining-type polymer."

•

Hydrated lime is making big inroads in its relatively new use as stabilizing agent for roads, according to a just-released survey by the National Line Assn. Some 240,000 tons of lime were used for this purpose in '58—33% increase over '57's demand. Some 20.1 million sq. yds. of roads, airport runways and parking areas were treated.

•

Entomologist Kirby Cockerham of the Louisiana Agricultural Extension Service won't be fielding complaints arising from use of pesticides in Southern sugar cane fields to fight the fire ant plague. Cockerham denies *CW*'s report (*Market Newsletter, March 21*) that he will be involved in pushing corrective measures, declaring emergency areas; LAES isn't that deeply involved, says Cockerham, and it's all up to the U.S. Dept. of Agriculture and the Louisiana Dept. of Agriculture and Immigration.

SELECTED PRICE CHANGES — WEEK ENDING APRIL 6, 1959

	Change	New Price
UP		
Benzaldehyde, tech., dms., c.l., t.l.	$0.04	$0.47
Pentaerythritol, tech., bags, c.l., dlvd.	$0.015	0.31
Sodium, metallic, bricks, c.l.	0.015	0.21
DOWN		
Lead metal, prime, pigs, N.Y.	0.005	0.11
Sodium hydride, 50% sol. in oil, dms.	0.30	0.95
Sulfur, rubbermakers, coml. reg., bgs., mines, 100 lbs.	0.10	2.45

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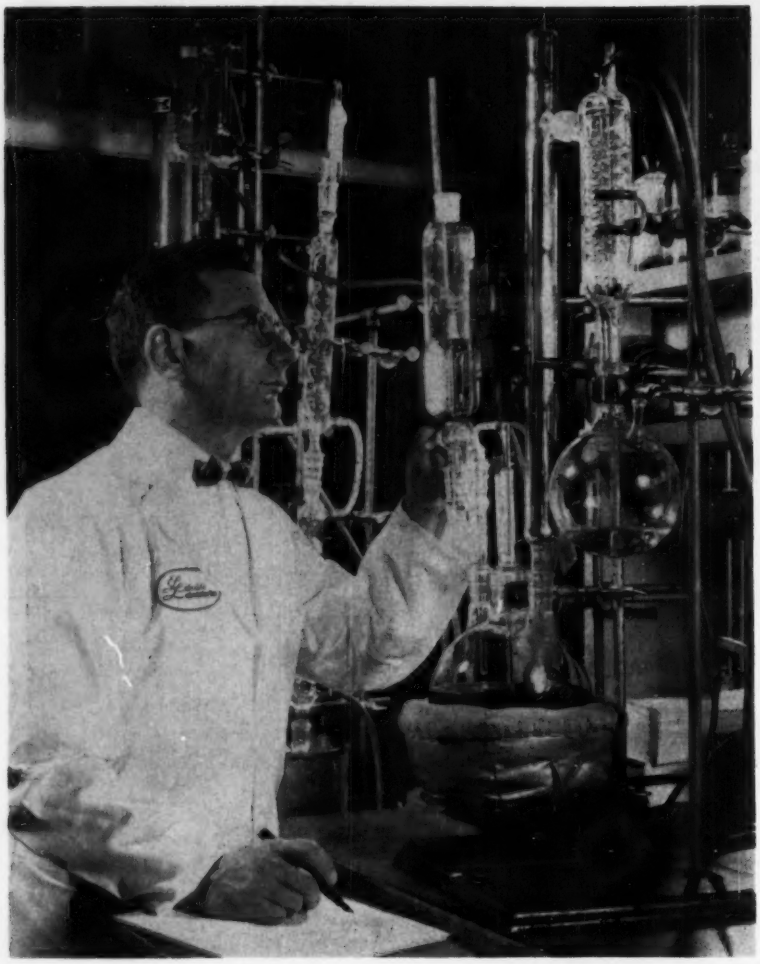


Lakeside's Biel charted low-pressure route to acetylene derivatives.

Seeking Acetylene Payoff

Lakeside Laboratories (Milwaukee) is pushing its acetylene-derivatives process closer to the payoff point this week as it prepares to move bench-tested synthesis techniques into a recently completed 4,000-lbs./year semiworks plant. Aldrich Chemical Co. (Milwaukee) will market the new products — acetylene-derived, unsymmetrically substituted diamines—which will make their commercial debut this fall.

Lakeside became interested in acetylene derivatives for their potential usefulness in the synthesis of pharmaceuticals. But the classical route to these products involved reactions in liquid ammonia at pressures of several thousand psi., was too hazardous and expensive to be economically attractive on a commercial scale.

The breakthrough that led to the commercially feasible process now employed by Lakeside was the discovery by chief chemist John Biel of a new route that permits the synthesis to be carried out at atmospheric pressure and moderate temperature.

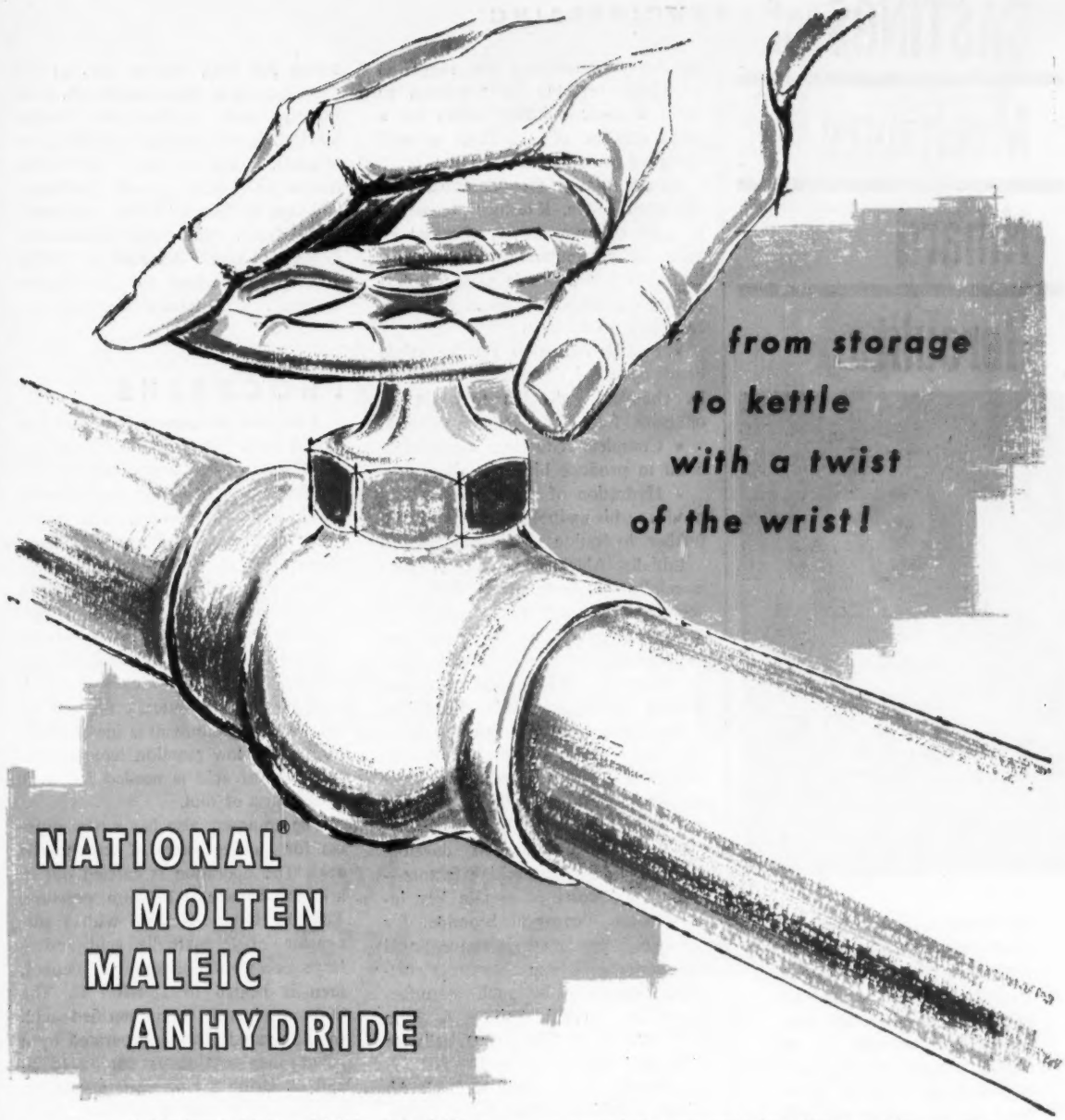
Sodamide Shortcut: In one version of Biel's process, a basic acetylenic halide, such as propargyl bromide, is reacted with an amine, e.g., diethylamine. This reaction produces 3-diethylamino-1-propyne and diethylamine hydrobromide. The former compound is then reacted with sodamide and a halogen-substituted amine, such as 3-diethylamino-1-chloropropane to yield 1,6-bis(diethylamino)-2-hexyne and split out the sodium salt. To produce an ethyne instead of the hexyne, a similar synthesis route is followed first to the propargyl amine, then by reaction with 3-dimethylamino-1-chloroethane to 1,6-bis-(dimethylamino)-2-ethyne.

The semiworks plant employed now by Lakeside is only one step removed from Biel's lab-bench setup, operates on a batch basis. First step in the synthesis is carried out in a 200-gal., agitated, glass-lined, steam-jacketed reactor vessel. The materials are heated in a benzene solvent for four to seven hours at about 20-25 C. After cooling to ambient temperature, the reaction mass is discharged through a 300-gal./hour plate and frame filter. The filtrate containing the acetylene intermediate is fed to a reflux still for recovery of the benzene solvent, after which the product is charged to a second 200-gal. reactor. Sodamide and the halogen-substitutes amine are added and reacted for four to six hours at 105-110 C in a toluene solvent.

Acetylenediamine product is extracted from the sodium salt by ether extraction in a third 200-gal. glass-lined vessel. Salt phase is discharged from the bottom of the vessel; the ether phase is fed to a stainless steel high-vacuum (150 micron) batch still for final product recovery.

Growth Forecast: Both Lakeside and Aldrich Chemical are convinced that this new family of acetylene chemicals has a bright commercial future.

Darwyn Kaestner, who is vice-president for production at Lakeside, describes the acetylenediamines as "unbelievably hungry compounds with a voracious appetite for other molecular fragments." All are straight-chain multicarbon molecules with three highly reactive centers — an amine group on each end and an intermediate triple bond. Says Aldrich President Alfred Bader: "With such centers available, any reasonable chemist can think up literally hundreds of useful reactions to carry out with each compound." As a result,



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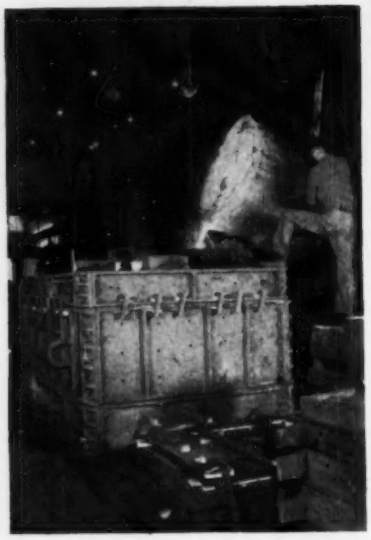

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the acetylenediamines are suggested as highly versatile intermediates to serve as basic building blocks for a large number of new and unusual chemical compounds.

In addition to the diaminoalkynes described above, Kaestner points out that the company has synthesized 19 such basic compounds — starting materials for a whole slate of corresponding diamino derivatives. Typical reactions include:

- Partial reduction of the triple bond by catalytic hydrogenation or by chemical reduction to yield cis or trans forms of bis-aminoalkenes.
- Complete reduction of the triple bond to produce bis-aminoalkanes.
- Hydration of the triple bond to produce bis-aminoketones, and by further hydration, bis-aminoalcohols.

Initially, Aldrich will offer as commercially available from stock six acetylenediamines* (all diaminohexynes). But others are in preparation at Lakeside and, potentially, at least as many as 76 distinct acetylene-derived chemicals are in the offing.

The current price of the acetylenediamines — $40/100 grams to $300/kilo — puts them in the fine-chemicals class. But Bader predicts that these costs will drop considerably as volume markets develop. However, there are limiting factors—notably the costs of certain key intermediates. Propargyl bromide, for example, is produced via conventional high-pressure (Reppe chemistry) acetylene processing by such manufacturers as General Aniline & Film (*CW, March 17, '56, p. 90*), sells for about $13/kilo.

Lakeside stands ready to back Aldrich's ambitious marketing program, plans to expand its present semiworks production facility substantially just as soon as the acetylenediamine market shows signs of increasing activity. At present, Aldrich is Lakeside's exclusive distributor, will likely hold this favored position for some time to come. However, Lakeside reports that it's interested in licensing its new process to other chemical manufacturers.

Among the most commercially promising applications for which Aldrich will be gunning in the immediate future are such diverse uses as the manufacture of pharmaceuticals, plasticizers, new alcohol-type solvents lubricating oils, various polymers, detergents, insecticides, herbicides, fungicides, plant growth inhibitors and rust inhibitors. "We're confident," says Bader, "that this commercial debut will mark the start of swiftly developing markets for acetylenediamines. . . . it's hard to see how they can miss."

*1,6-bis-(diethylamino)-2-hexyne; 1,6-bis-(morpholino)-2-hexyne; 1,6-bis-(pyrrolidino)-2-hexyne; 6-diethylamino-1-morpholino-2-hexyne; 6-diethylamino-1-piperidino-2-hexyne; and 6-diethylamino-1-pyrrolidino-2-hexyne.

PROCESSES

Two New Processes: Badische Anilin- & Soda-Fabrik AG. (Ludwigshafen, Germany) has a preliminary patent (DAS 1,043,342) on an improved tetrahydrofuran process. The route starts with raw 1,4-butanediol (containing up to 30% water), which reacts at 110 C with a small amount of 50% sulfuric acid as catalyst. Butanediol is added continuously as tetrahydrofuran and water distill off. The method, BASF says, features yields over 99% and practically no side reactions; and equipment is inexpensive, due to the low reaction temperature. One part of acid is needed for each 5,000 parts of diol.

The company also has a new process for making esters of terephthalic acid. The operation is carried out in a double-U-tube at 170-atm. pressure. The first U-tube is filled with a suspension of terephthalic acid and a large excess of the desired alcohol, then is heated to 180-200 C. The main product is monoesterified acid. In the second U-tube, separated by a valve, the reaction is completed at 280 C. Using a zinc acetate catalyst, the process is said to produce yields over 90% without ether by-products.

•

Cesium Recovery: A plant for the recovery of radioactive cesium from highly active wastes will be designed for United Kingdom Atomic Energy Authority by W. Fraser & Co., British chemical engineering contractors.

•

Safer Vacuum Heating: Use of air-cooled molds for safer arc-furnace melting is proposed by the U.S. Bureau of Mines (Albany, Ore.). According to the bureau, explosions have occurred when high-melting metals accidentally burned through water-cooled molds and contacted the water. The proposed air-cooled molds

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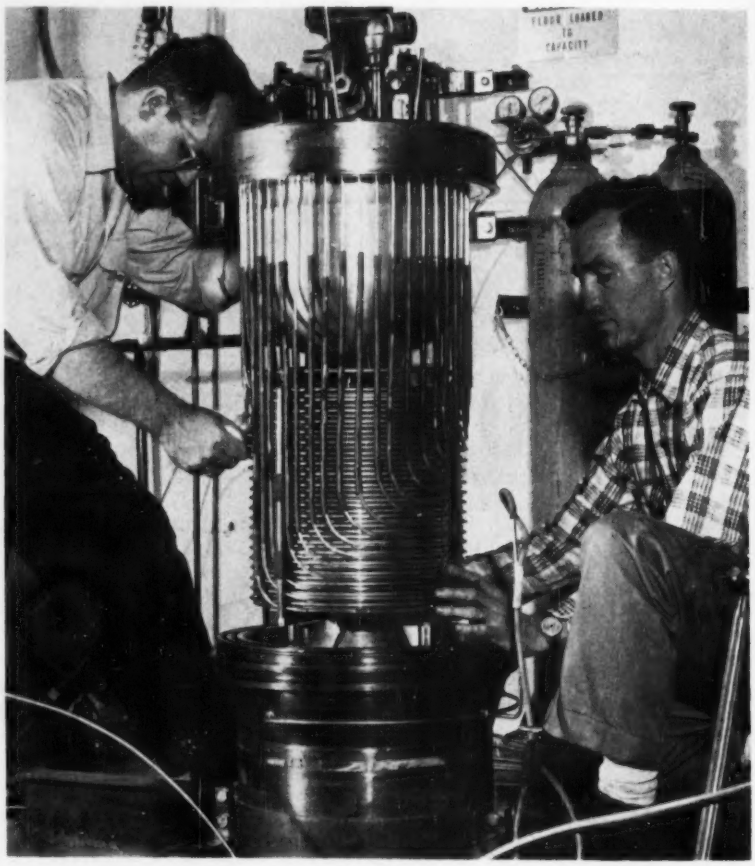
were found to provide up to 35% more cooling efficiency than water-cooled units, and did not explode when the mold burned through.

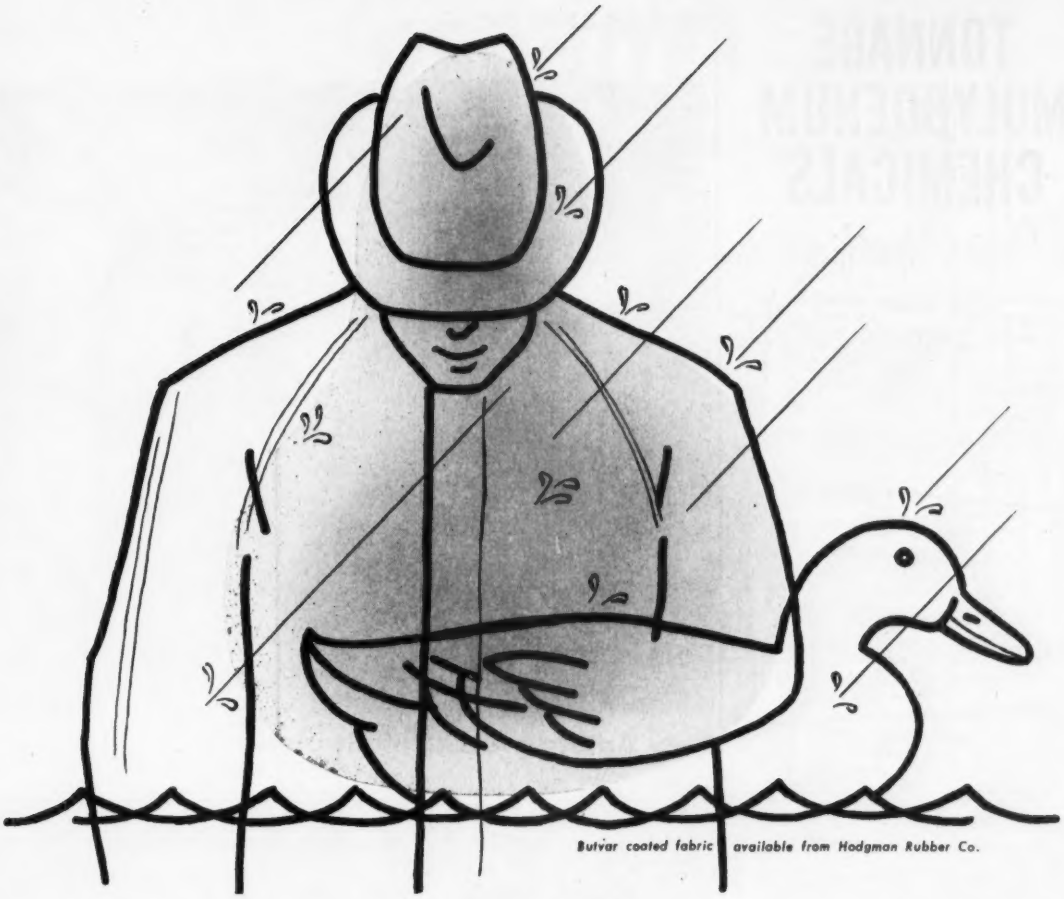
•

Direct Acetaldehyde Route: A direct route from ethylene to acetaldehyde has been developed by Consortium fuer Elektrochemische Industrie GmbH. (Munich, Germany). The new method involves air oxidation in the presence of a palladium dichloride catalyst (in aqueous solution) at room temperature, gives yields over 90%. The process can also be used to produce other carbonyl compounds from olefins and their derivatives (e.g., unsaturated acids, halides and alcohols).



Heat Reactor Has Heart of Gold

Generation of superheated steam in a single pass through a nuclear reactor is the goal of operational tests now under way at AEC's Los Alamos Scientific Laboratory. Heart of the LAPRE II homogeneous reactor is a gold-clad heat exchanger being lowered into a gold-lined pressure vessel (*above*) by project leader Robert Clark (*left*) and engineer James Bridge. In operation, the nuclear reaction of an aqueous solution of enriched uranium phosphate in phosphoric acid surrounding the heat exchanger produces a temperature of 800 F. The reaction is self-regulating, since the temperature rise causes the fuel to expand 15%, thereby reducing its nuclear activity. Withdrawal of heat by the generation of steam in the heat exchanger lowers the fuel temperature, causing the fuel to contract and nuclear activity to increase. In addition to determining operational characteristics of the system, LASL hopes to prove the efficacy of gold cladding as a means of controlling corrosion—one of the most troublesome problems encountered in working with homogeneous fuels.



Butvar coated fabric available from Hodgman Rubber Co.

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Chloride (Cl)	0.002 % Max.
Nitrate (NO_3)	<0.003 % Max.
Phosphate (PO_4)	0.0005% Max.
Sulfate (SO_4)	0.020 % Max.
Ammonium (NH_4)	0.001 % Max.
Heavy Metals (as Pb)	0.005 % Max.
Particle Size (Mesh):	at least 90% thru U.S. No. 40 Sieve; at least 10% thru U.S. No. 325 Sieve

AMMONIUM MOLYBDATE, REAGENT
$(NH_4)_6Mo_7O_{24}\cdot 4H_2O$ F.W. 1235.954
Meets A.C.S. Specifications

Assay (as MoO_3)	81.0-83.0%
Insoluble Matter	0.005 % Max.
Chloride (Cl)	0.001 % Max.
Nitrate (NO_3)	<0.003 % Max.
Arsenic, Phosphate and Silica (as SiO_3)	0.0005 % Max.
Sulfate (SO_4)	0.005 % Max.
Heavy Metals (as Pb)	0.001 % Max.
Magnesium and Allied Cations	0.020 % Max.
pH of 5% Solution at 25°C	5.0-6.0
Particle Size (Mesh):	at least 95% thru U.S. No. 20 Sieve; at least 90% on U.S. No. 140 Sieve

SODIUM MOLYBDATE, TECHNICAL ANHYD.
Na_2MoO_4 F.W. 205.932

Assay (Na_2MoO_4)	98.0 % Min.
Insoluble Matter	0.050% Max.
Chloride (Cl)	0.20 % Max.
Sulfate (SO_4)	0.20 % Max.
pH of 5% Solution at 25°C	9.0-10.0

AMMONIUM MOLYBDATE, C.P.
$(NH_4)_6Mo_7O_{24}\cdot 4H_2O$ F.W. 1235.954

Assay (as MoO_3)	81.0-83.0%
Insoluble Matter	0.010 % Max.
Chloride (Cl)	0.005 % Max.
Nitrate (NO_3)	0.010 % Max.
Phosphate (PO_4)	0.001 % Max.
Sulfate (SO_4)	0.010 % Max.
Heavy Metals (as Pb)	0.003 % Max.
pH of 5% Solution at 25°C	5.0-5.5
Particle Size (Mesh):	at least 95% thru U.S. No. 20 Sieve; at least 90% on U.S. No. 140 Sieve

MOLYBDIC ACID, REAGENT
Meets A.C.S. Specifications

Assay (as MoO_3)	85.0 % Min.
Insoluble in NH_4OH	0.010 % Max.
Chloride (Cl)	0.002 % Max.
Phosphate (PO_4)	0.0005% Max.
Sulfate (SO_4)	0.020 % Max.
Ammonium (NH_4)	13.0-15.0% Max.
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Particle Size (Mesh):	at least 97% thru U.S. No. 40 Sieve; at least 10% thru U.S. No. 325 Sieve

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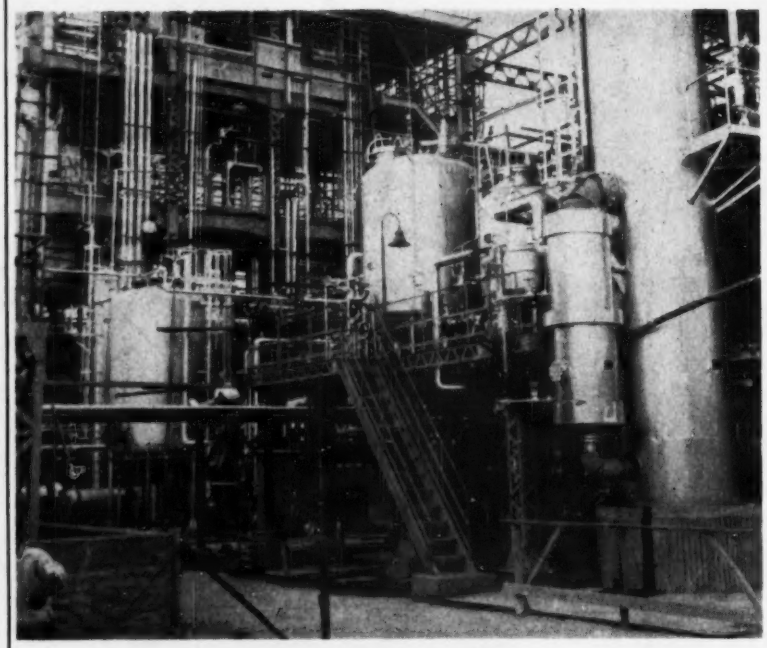
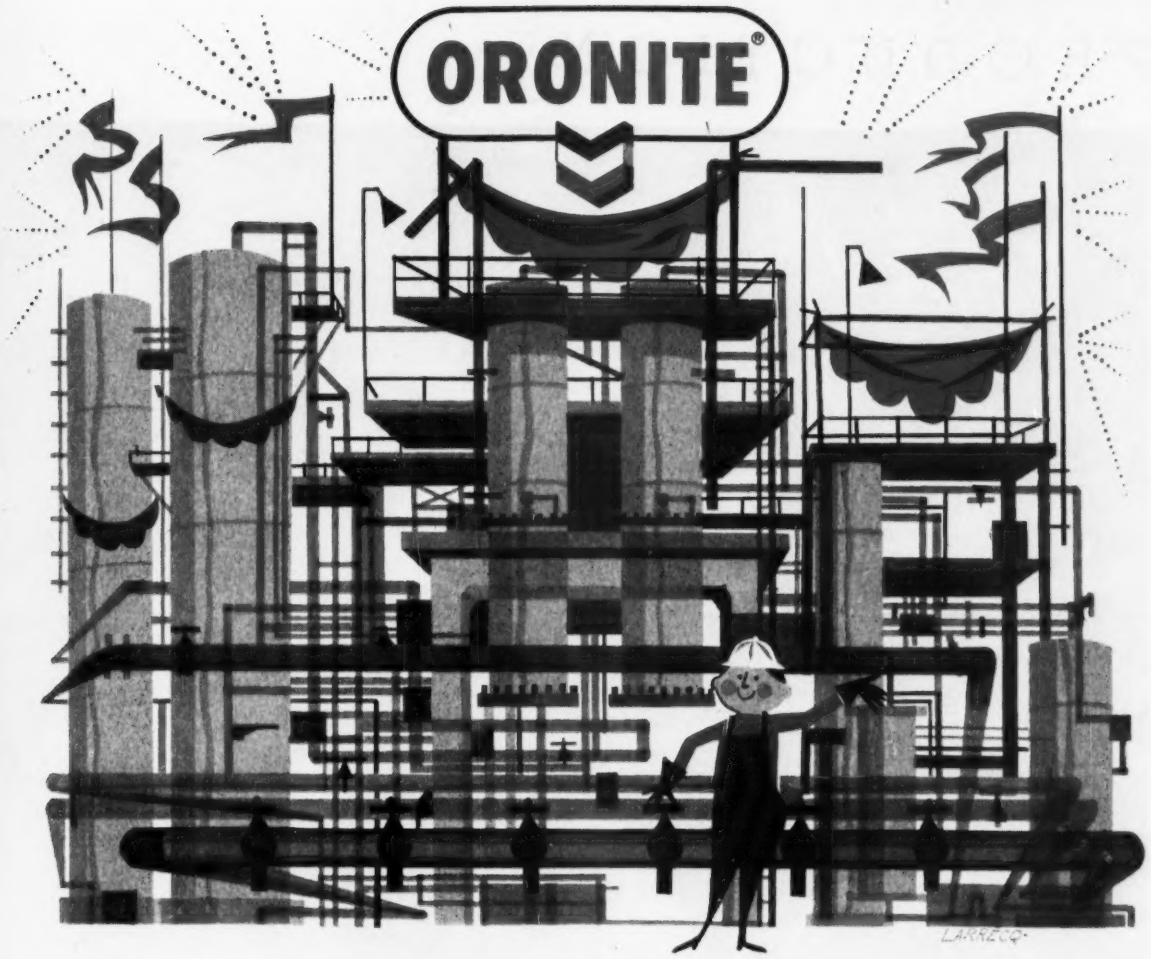


New Amoco-process plant yields . . .

Terephthalic for Japan

First pictures of the world's first operating plant using Amoco Chemicals' xylene oxidation process, at Iwakuni, Japan (*CW Technology Newsletter, Dec. 27, '58*), were released this week by Scientific Design Co. (New York). Owner of the new plant and now one of the world's largest producers of terephthalic acid: Mitsui Petrochemical Industries. Shown above is part of the plant's oxidation unit. Below, SD Vice-President Henry Peters joins plant operators to see the first bags of terephthalic roll off the line. Product is destined for Terylene manufacture in Japan under license from Imperial Chemical Industries Ltd.

Amoco says that construction of its plant at Joliet, Ill., has been completed and that final startup is expected within a few weeks. Both the oxidation and separation sections of the plant have been operated "at varying degrees of efficiency," but some startup bugs must be eliminated. Amoco's plant triggered the recent round of phthalic derivative price cuts.



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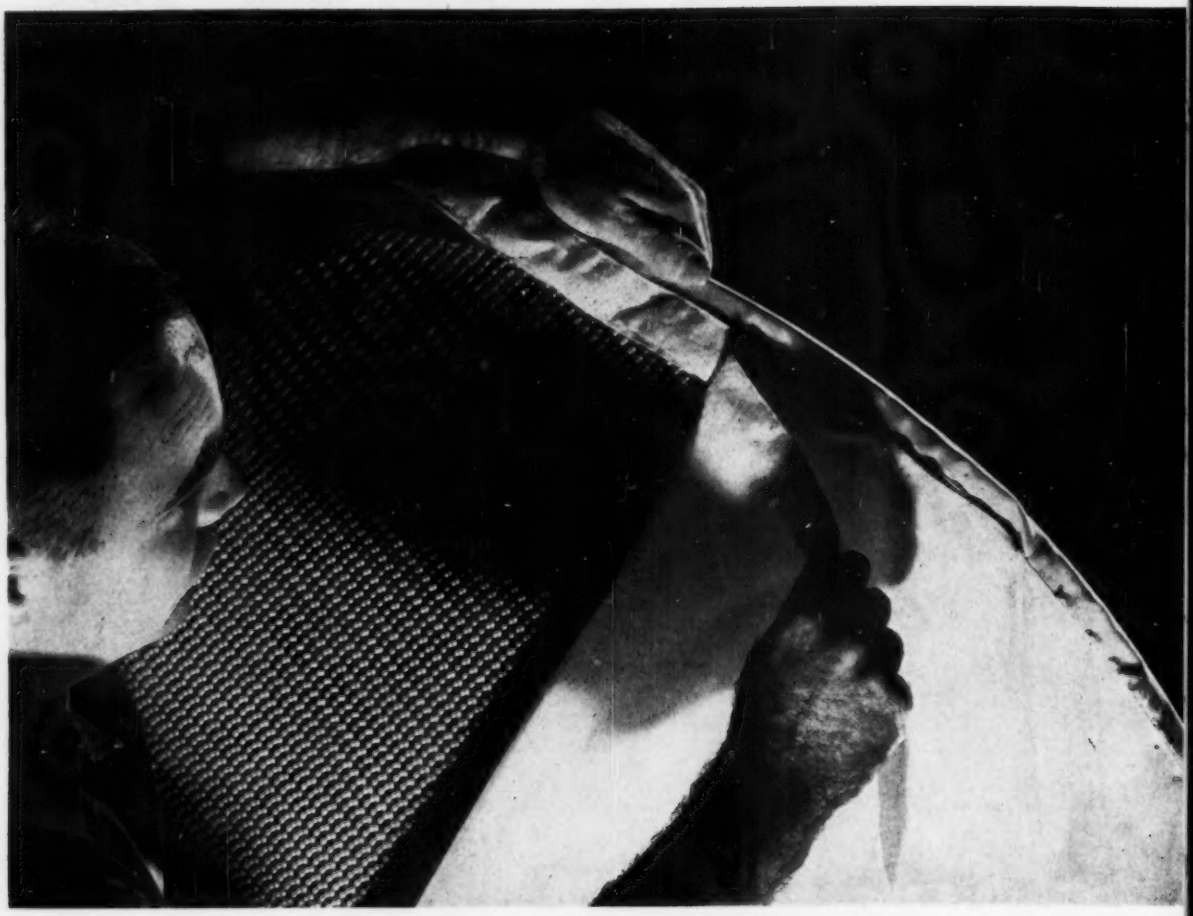


New nonmetallic fastener on filter-leaf cover permi ts speedy installation or replacement of the cover.

New Closure Out to Win Chemical

With a just-completed design improvement aimed at increasing its strength, a new fastening device is now being launched on a campaign to win industrial jobs, such as simplifying the attachment of filter cloths (above). The novel closure device, Velcro, has already scored in the clothing field as a competitor of zippers.

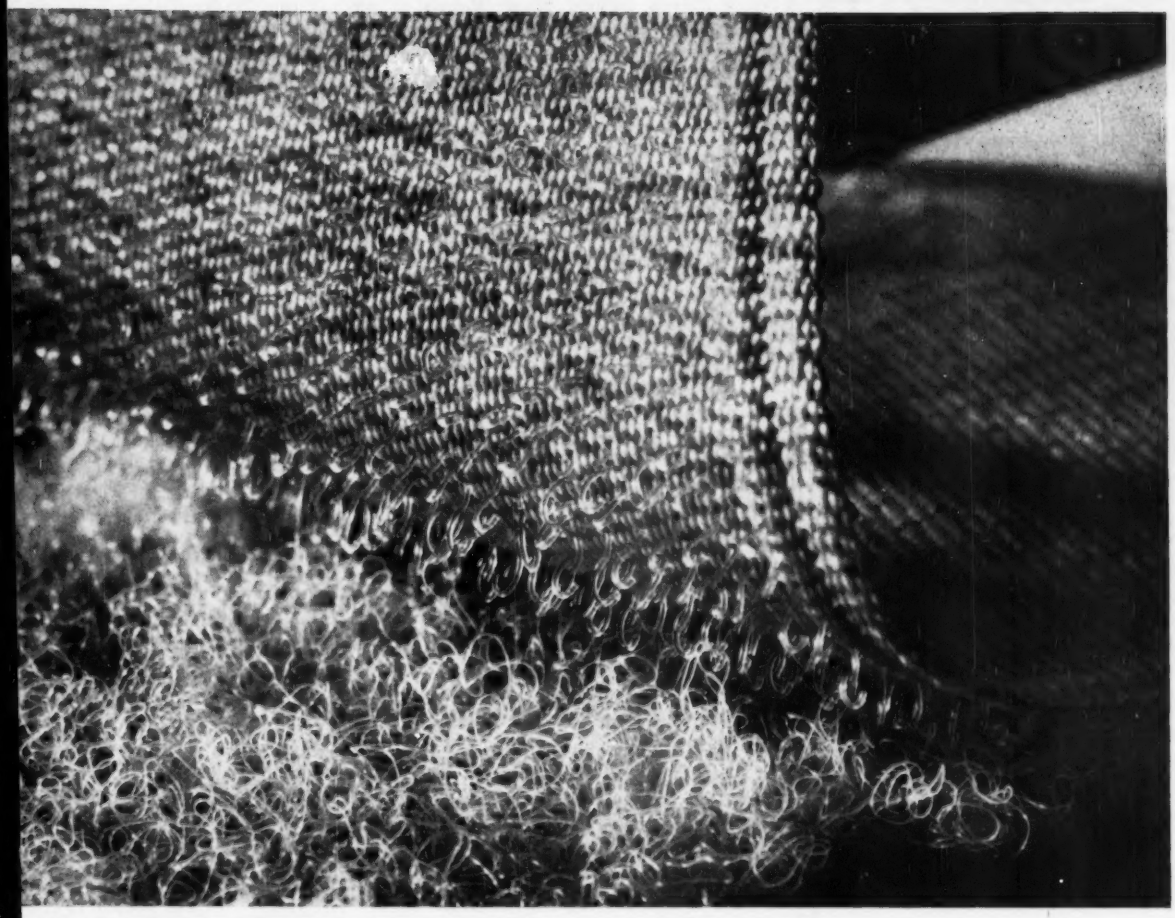
In the past few months, Velcro has found some jobs in process industries. At a sugar refinery, for example, it has replaced hand-sewn closures for leaf covers of Sweetland filters. In doing so, the device has cut covering costs by one-third. And, at a paper plant, it has reduced the time needed to change cloth sleeves on the rolls of a coating machine from four man-hours to 10 man-minutes.

The timesavings came from the speed with which the fastener may be closed or opened. Velcro is essentially two nylon tapes, one with thousands of tiny, soft nylon loops, the other with tiny, stiff nylon hooks. When these are pressed together the hooks and loops engage. And, although they may be swiftly and easily peeled apart, a little at a time, a considerable force is needed to pull the tapes apart any other way.

Tests by a consumer testing agency on a garment closure show that it takes 16 lbs. to pull Velcro apart sidewise (the direction of pull on clothing). And after five launderings, five drycleanings and 32,500 closing-opening cycles, it still took 14.2 lbs. to pull the fastener apart. The tests were run with 1-in.-wide tape; the force required to pull apart wider tape, or to pull the tape apart lengthwise would be greater because of the greater number of hooks and loops resisting the pull.

Velcro Sales Corp. (New York), which is marketing the tape, says these are about the only tests that have been published so far. But it is currently engaged in similar testing on the just-completed design. This has fastening strength that's an estimated 25-30% greater. Test results on the improved Velcro are expected within a month.

Uses to Come: Like testing, most of the uses for Velcro are still in the offing. It took about 10 years for George de Mestral to develop the



Photomicrograph shows how tiny hooks of one tape engage loops of second tape to form closure.

Processing Jobs by Hook and Loop

tape in Switzerland, and it has been in production in this country by American Velcro, Inc. (Manchester, N.H.) only since last fall.

So far, only one company, Syntech Fabricators (Passaic, N.J.), which offers synthetic filter fabrics and screen cloths, is selling Velcro directly in the chemical process field. Syntech has been supplying Velcro closures on some of its custom-made products. since the end of last year. It first heard of Velcro through the Swiss ties of its parent company, Tobler, Ernst & Traber, Inc.

Harold J. Luckett, general manager of Syntech, boosts the fastener enthusiastically, feels industrial applications may eventually surpass those in the clothing field. But ingenuity will be required to adapt it to many situations.

For example, Luckett cites the fastener's application in the filtration of hot oil. The presses required heavy filter fabrics, because lighter-weight, less-expensive nylon fabric leaked around the frame edges. But one piece of Velcro tape, bonded to the metal frame, with the mating piece sewn to the filter cloth, prevented leakage, permitted the lighter-weight cloth to be used. Moreover, Velcro held the cloth taut for scraping when the press was opened, reduced cloth wrinkles.

One other application seems to be near commercialization: the attachment of nylon screen to the metal frame for a sifting operation. (The nylon is currently glued on.) A nonferrous metals company is most interested in this technique; it has already shifted from stainless steel screening (welded to the frame) to glued nylon.

The Velcro also must be bonded to the screen. This could be done either with glues (Le Page's 15-50, General Adhesives' 773-146, are typical products) or by some other system. In addition to being glued, Velcro can also be sewn or stapled to the material requiring a closure. This variety of attachment methods should permit Velcro's use on plastics, leather, other materials. For example, it might serve as a strapping for insulation, or as an adjustable closure for drive and conveyor belts.

Because Velcro is made only from nylon at the present time, service

Most Versatile

The most versatile wax compatible resin made — Shanco 300, reaches into innumerable varied fields.

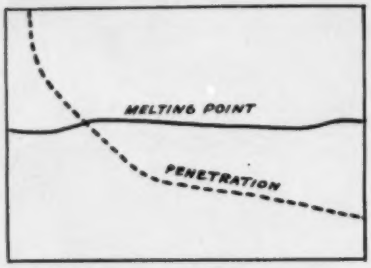


Chart shows unaltered melting point up to 40% resin content during a drop in penetration from 10 down to 1.

Shanco 300 will decrease the penetration of softer waxes without materially altering their other characteristics, as melting point and viscosity, this property provides a handy formulating tool in the compounding of hot dip coating, potting and impregnating compounds.

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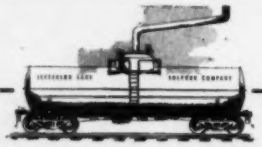

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PRODUCTION

temperatures would have to be kept below nylon's melting point (Velcro has been known to soften on extended use at temperatures above 310 F). And the applications would have to be light-duty, might require considerable lengths of the fastener to obtain the necessary strength.

Velcro is a relatively expensive plaything. Costs range from 50¢ to $2/yd.,* ruling out novelty and some convenience uses. For example, Velcro might add about $1.50 to the cost of a $2-6 filter cloth, making time and labor savings the decisive factors. The speed with which Velcro develops as a chemical industry fastener will depend on the number of time-saving jobs that can be turned up for it.

EQUIPMENT

Radiometric Weighing: Tracerlab, Inc. (Waltham, Mass.) now offers systems for radiometric weighing of materials being conveyed by continuous means, such as belt, pipe or chute. The method involves a radioactive source—e.g., cobalt-60—and a scintillation detector on the other side of the material. Since the absorption of the gamma rays emitted by the source is directly proportional to the mass of the material, the signal produced by the detector can give a continuous record of the weight. The basic system, which can be applied to existing conveying installations, costs $5,000-20,000.

•

Particle Accelerator: Radiation Dynamics, Inc. (Westbury, L.I., N.Y.), has developed a particle accelerator that it says offers improved reliability and maintenance characteristics at lower cost than previous accelerators. Two models of the machine, called Dynamitron, deliver 1.5 mev. at 15 kw. and 3 mev. at 30 kw. The new accelerator, says RDI, can deliver as much as 10 times more beam current for the same capital investment than an electrostatic-type generator.

•

Glassed Ductile Iron Fittings: Starting July 1, Pfaudler Co. (Rochester, N.Y.) will make available fittings of glassed ductile iron. The new fittings are said to offer greatly increased shock resistance and to be 2½-3 times stronger than conventional glassed gray iron fittings. The new fittings (tensile strength: 60,000 lbs. minimum) will be able to handle many jobs where the conventional fittings have been ruled out because of the danger of rupture.

•

Btu. Meter: A new, low-priced mechanical meter for measuring heat transfer in process streams and air-conditioning systems is offered by American Meter Co. (Garland, Tex.). The Btu. meter, Model 200, multiplies temperature change of the liquid by the flow rate, registers flow and heat transferred on two counters. An indicator gives differential temperature readings.

•

Vacuum Resistance Furnace: NRC Equipment Corp. (Newton, Mass.) has what it says is the first high-vacuum resistance furnace with the hot-zone capacity to handle production as well as laboratory work at temperatures up 2400 C. The new furnace, Model 2915, can be operated at absolute pressures of 10^{-5} mm. of mercury, has a heating unit about 6 in. in diameter, 10 in. high. The regular model is completely self-contained, with furnace chamber, pumping system, power supply and controls in one cabinet. A stripped-down version—without the cabinet and with a portable pumping system—is also available.

•

Hydraulic Pump: A new variable-delivery 5-gpm. vane pump is now available from Vickers Inc. (Detroit 32). The new pump includes an integral pressure compensator that controls pump volume at preselected adjustable pressures up to 1,000 psi.

•

Descaling Tool: A Swiss-made tool for cleaning, derusting and descaling is now available from Swissair Tool Corp. (Buffalo, N.Y.). Particularly suited for working on irregular surfaces, the tool, called Vonarx-Pistol, is a form of pneumatic hammer, with the heads consisting of a number of independently operated metal spikes or needles. Operating cost is 7-10¢/-hour.

•

Machinable Ceramic: Duramic Products, Inc. (262-72 Mott St., New York 12), now offers its HT-2 heat-

*Tape ½ in. wide, 50¢; ¾ in., 75¢; 1 in., $1; 1¼ in., $1.25; 2 in., $2; tape with hooks or loops only, at half the indicated prices.

Lubrication News

PROFITABLE IDEAS ON THE LUBRICATION OF CHEMICAL PROCESS EQUIPMENT

PLANT REDUCES LUBRICANTS FROM 27 TO 7—PROCESSING IS IMPROVED

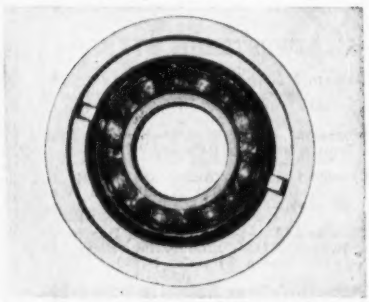
Multi-purpose greases cut lubrication costs

One plant in the basic chemicals industry has eliminated 20 lubricant specifications from its inventory. The maintenance supervisor reports that the plant is operating more efficiently than it ever did before.

This is just one example of a cost-cutting trend to fewer lubricants in chemical plants. Multi-purpose greases are replacing numerous specialty lubricants—even in areas of high heat, exposure to water or moisture, and oxidation or corrosion.

How multi-purpose greases cut costs

The most important cost-saving advantage of using multi-purpose greases is this: the man who lubricates equipment always uses the right grease. He doesn't have to choose the lubricant from among several drums. As a result, there's less chance of putting the wrong lubricant into a valuable piece of process equipment.



Bearing stopped in motion by high speed photography. Note how grease completely floods retainer and moving parts.

In addition, less lubricating equipment is required to apply multi-purpose greases. Perhaps only one grease gun will be needed for one entire part of a plant. And—there can be no confusion about which applicator goes with each lubricant. As a result, lubrication rounds take less time—labor costs go down.

Use of a multi-purpose grease also saves time in training lubrication crews, by making it easy to select the proper lubricant. It's easier, too, to set up a centralized, automatic lubricating system when only one lubricant is used.

Grease fully protects bearings

Multi-purpose greases are now available that completely lubricate all types of bearings and sliding surfaces. They also seal against dust, water contamination, or corrosive products and atmospheres.

These multi-purpose greases contain inherent properties that make them satisfactory for all except extreme or unusual operating conditions. They have good resistance to water washing. They will absorb limited amounts of water without change in consistency. They provide good resistance to oxidation. Maximum continuous usable temperature can be as high as 300° F. Stability on working is in many cases excellent.

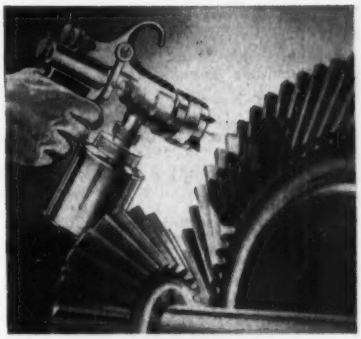
New movie shows how grease tests predict performance in plant

How well will a grease stand up under pressure? How long will it resist washing by water? How much can it take before it shears or leaks? What happens under conditions of extreme cold? Heat?

A new movie, "Shear Magic," reveals how laboratory tests anticipate what happens when a grease is exposed to these conditions in the plant. Described are the "4-ball load test," which measures how well a grease stands up under pressure; water washing and rusting tests; leakage tests; and tests for resistance to heat, cold and wear.

The movie also shows how greases of all kinds are made, and explains the mechanics of grease lubrication.

A showing of the 25-minute sound and color movie can be arranged at your plant. Attach coupon at right to your letterhead.



Spray system protects open gears against abrasion by dust, dirt

Open gears have long been lubricated by applying heated grease with a hand paddle. This has to be done when the gears are not running. Now, a spray application method makes it possible to lubricate open gears without machine downtime—and without sacrificing the complete protection required, especially in areas of excessive dust and dirt.

Another advantage of spray application is that it keeps the gears cleaner, less likely to foul up with contaminants.

The method described permits use of either manual or automatic spray applicators.

Management Practices Book

This guide to organized lubrication can help you achieve important savings in maintenance costs. It discusses methods that help raise production, extend parts life, cut downtime. For free copy, use coupon below.

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I am attaching my company letterhead to this coupon.

- ☐ Send a copy of Management Practices that Control Costs via Organized Lubrication.
- ☐ Send more information on the movie, "Shear Magic."
- ☐ Ask a Texaco Lubrication Engineer to call at my plant.
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PRODUCTION

shock-resistant ceramic material in a machinable form, called HT-2-M. The new material can be used to make prototype or production parts without firing facilities. It is available in rods, discs and custom shapes.

•

Titanium Pumps and Valves: Centrifugal pumps and valves made of titanium are now being manufactured to order by Duriron Co. (Dayton, O.). Pump sizes start at ½ gpm. Three-way valves range from 1 to 4 in.; plug valves from ¼ to 3 in.

•

High-Temperature Boiler: Boiler Engineering & Supply Co. (Phoenixville, Pa.) has developed a new package high-temperature water boiler, called Flo-Kontrold. Water is circulated at temperatures of 250-450 F, with system loads ranging from 4 to 100 million Btu./hour.

•

Pipe-Fitting Insulators: Insul-Coustic Corp. (Maspeth, L.I., N.Y.) has a new line of molded Fiberglas insulators for pipe fittings that are said to offer unusual installation ease. The fitting insulators, called Insul-Sure, are installed by placing the two halves over the fitting and stapling, wiring or taping the sections together. Insul-Sure is available in 1-in. thickness for screwed fittings from ½ to 8 in., for welded fittings from 2 to 8 in; material 1½ in. thick is available for screwed fittings from ¾ to 8 in., for welded fittings from 2 to 12 in.

•

Angle Control Valve: An angle control valve claimed to have improved venturi effect and reduced turbulence and cavitation in slurries, viscous and flashing fluids, is a new product of Minneapolis-Honeywell Regulator Co.'s Valve Division (Fort Washington, Pa.). The valve is pneumatically operated, is available in 1- to 6-in. sizes, inclusive, with ratings to 600 psi.

•

Thickness Tester: Branson Instruments, Inc.'s (40 Brown House Road, Stamford, Conn.) new ultrasonic thickness tester is designed to provide compactness and portability. The unit, including batteries, probe, harness, cable and earphones, weighs less than 5 lbs. The direct-reading instrument is called Audigage Model 6, will measure thicknesses in the 0.09- to 5.0-in. range with 3-5% accuracy.

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Industrial Salesman: Excellent opportunity for technical salesman with protective coatings or plastics sales experience to sell to an expanding market. Prefer chemistry or chemical engineering background. Should be familiar with Eastern United States sales area. Send résumé for confidential consideration to: Employment Manager, Archer-Daniels-Midland Company, P.O. Box 532, Minneapolis 40, Minnesota.

Plastics Salesman—Spencer Chemical Company seeks a man with enthusiasm, drive and a desire for future progress in a plastics sales assignment. Previous sales experience desirable. Technical background also preferable but not necessary. Excellent opportunity for future advancement in a rapidly expanding organization. Please send résumé of your experience, education, and salary requirements to: Field Sales Manager, Plastics Division, Spencer Chemical Company, 1004 Baltimore, Kansas City 5, Missouri.

Wanted: Chief Latex Chemist capable of earning $10,000 minimum. Write qualifications to P-1329, Chemical Week.

Sales Engineers (2)—M. E. or Chemical Engineering degree. Spray Dryer Equipment. Prefer New Jersey residents. Submit complete résumé indicating salary expected. P-1380, Chem. Week.

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Seek established Sales Engineering Affiliate with office located in Phila-Wilm-Balt area. Require affluent graduate chemical-mechanical engineer's handling heavy process equipment. Reply in detail. RW-1403, Chemical Week.

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Research Supervisor: Strong background in product development; proven by international sales. Capable of coordinating research for management and sales. Experienced in technical service for customer relations. Diversified research experience. Ph.D. Age: 44, PW-1372, Chem. Wk.

Chemical graduate this June Worcester Poly-Tech, desires West Coast position with opportunity for advanced degree study. PW-1327, Chemical Week.

Product and Technical Literature Specialist. 5 agency years responsible for creation and production chemical literature. PW-1418, Chemical Week.

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Expanded Perlite Powder. Finely divided white siliceous inorganic powder packed in 4 cu. ft. 50 lb. paper bags. Used as filler and extender in coatings, insecticides, ceramics and plastics. Priced $50. per ton f.o.b. Nashville, Tennessee. For samples and information write Sales Manager, Chemical Division, Tennessee Products & Chemical Corporation, P. O. Box 9, Nashville 2, Tenn.

Oliver 5'3" Rotary Vacuum Filter, precoat, 25# pressure T316 SS contact parts. Perry Equip. Corp., 1415 N. 6th St., Phila. 22, Pa.

3500 Gal. Vertical Nickel-Clad Tanks, 6'6" x 12' high, 3' deep cone bottom, vacuum. Perry, 1415 N. Sixth St., Phila. 22, Pa.

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Interested in purchasing used lab equipment, including Analytical Balances, Drying Ovens, Hot Plates, etc. Address list to W-1391, Chemical Week.

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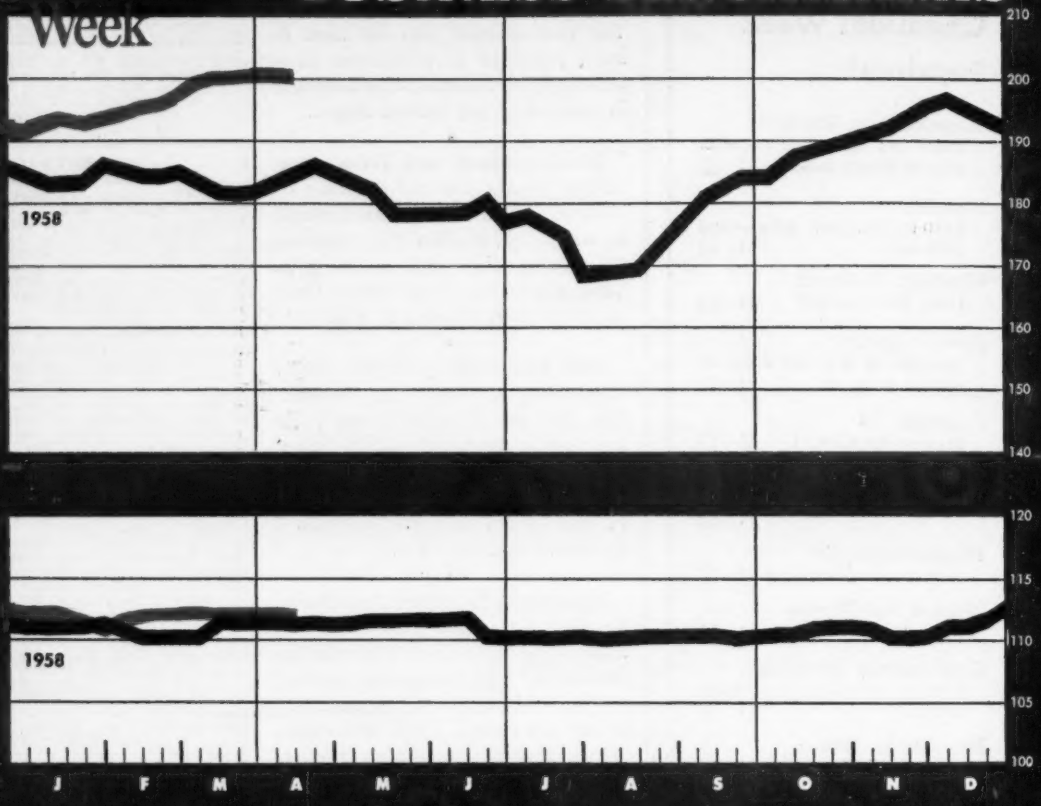
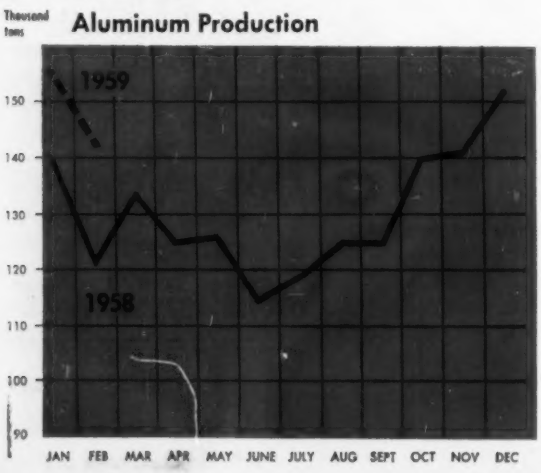
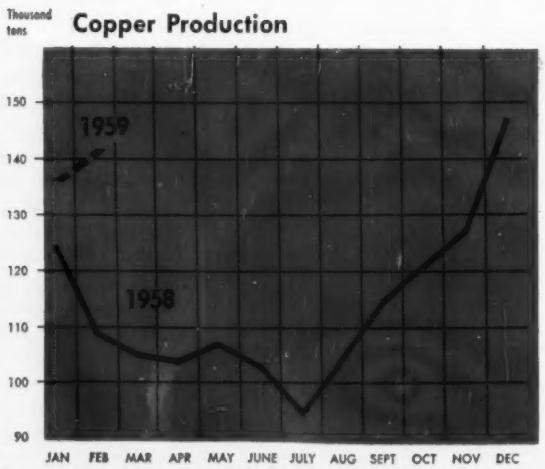


APRIL 11, 1959

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-1949=100)	201.5	202.4	184.5
Chemical Week wholesale price index (1947=100)	112.0	112.1	110.9
Stock price index (11 firms, Standard & Poor's)	52.25	53.02	38.34
Steel ingot output (thousand tons)	2,653	2,631	1,312
Electric power (million kilowatt-hours)	12,709	12,900	11,645
Crude oil and condensate (daily av., thousand bbls.)	7,193	7,203	6,264

MONTHLY INDICATORS—Wholesale Prices (1947-49=100)	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	127.7	127.5	125.7
Chemicals and allied products	109.9	110.2	110.6
Industrial chemicals	123.7	124.0	123.6
Paint and paint materials	120.3	120.6	119.8
Drugs, pharmaceuticals and cosmetics	93.1	93.0	93.6
Fats and oils (inedible)	58.9	59.9	62.9
Fertilizer and materials	107.5	107.6	110.4





CALCIUM CYANAMIDE

An old chemical that merits a new look

Back in 1835, the first cyanamide salt was prepared. Then, for many years, cyanamide and its salts remained laboratory chemicals until calcium cyanamide gained prominence as a basic chemical providing ammonia to fertilize farm land for Europe's expanding population. Since then, CaNCN has been the starting point for literally hundreds of compounds, but today it is sometimes overlooked in searches for new ones. As an economical, basic raw material, cyanamide, via calcium cyanamide, should have a definite place in your research program.

What will it do?

Addition reactions of the nitrile group

$$H_2NCN + CH_3NH_2 \longrightarrow H_2N - \overset{\overset{NH}{\|}}{C} - NHCH_3$$

This reaction is one of the well-known series with ammonium salts and amines yielding guanidine salts and substituted guanidines. Such products are utilized frequently in production of insecticides, fungicides, dyestuffs, and explosives. Among other chemicals which react with cyanamide by addition to the nitrile group are: water • aliphatic alcohols and phenols • hydrazines amino acids and amino alcohols • dicyanamides • amides cyanates and isocyanates • nitriles • olefins • aldehydes organic acids • and many others.

Substitution reactions of the amino group

$$2CH_3I + CaNCN \longrightarrow (CH_3)_2NCN + CaI_2$$

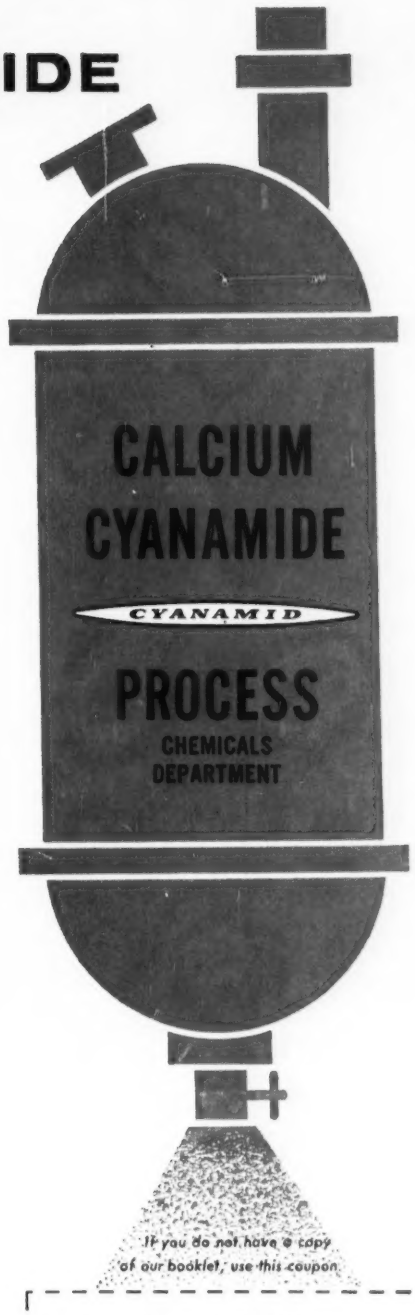
Diakyl cyanamides can be prepared by the reaction of alkyl halides and calcium cyanamide, usually in an alcoholic medium. Other substitutions of the amino group take place with: acid anhydrides • diazonium salts ketones • esters • cyanogen halides • cyanides • metals.

Degradation reactions

$$Na_2CO_3 + CaNCN \xrightarrow{500\text{-}600^\circ} 2NaOCN + CaO$$

Formation of an alkali cyanate occurs when calcium cyanamide is heated with at least an equivalent of an alkali carbonate. Other degradation reactions include oxidation, reduction, and reactions with carboniferous compounds • sulfur and sulfides • boric acid • nitrous oxide.

For additional information, your Process Chemicals salesman is the man you need. Contact him now.



If you do not have a copy of our booklet, use this coupon

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Process Chemicals Department
30 Rockefeller Plaza, New York 20, N. Y.

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Pigments on combat duty

The fence in the color photograph above is part of the 2½-mile system of test fences (partially shown at top) at Titanium Pigment Corporation's weathering test station at Sayville, Long Island. Here, TITANOX* white titanium pigments go on "combat duty" under actual weather conditions.

This particular fence is testing house paints, with varying combinations of TITANOX pigments and other ingredients, for staining from hardware. You can see that two of the white panels are discolored by stain, while the middle one remains clean. This is typical of the careful testing that characterizes our cooperation with many paint formulators. Test fence studies at Sayville are supplemented by studies at other locations, as well as on actual houses and other structures.

TITANOX white pigments undergo comparable evaluation for use in many other products besides paints: in paper, rubber, plastics, ceramics, inks, leather and roofing granules. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; offices and warehouses in principal cities.

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

*TITANOX is a registered trademark for the full line of titanium pigments offered by Titanium Pigment Corporation.

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